3001486
SONY BDA
VO9600

SONY

VIDEO CASSETTE RECORDER

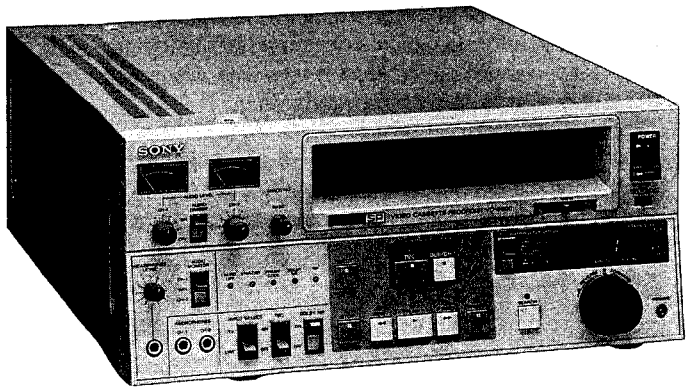
VO-9600

OPERATING INSTRUCTIONS page 2

Before operating the unit, please read this manual thoroughly and retain it for future reference.

MODE D'EMPLOI page 45

Avant la mise en service de cet appareil, prière de lire attentivement ce mode d'emploi que l'on conservera pour toute référence ultérieure.



© 1987 by Sony Corporation

OWNER'S RECORD

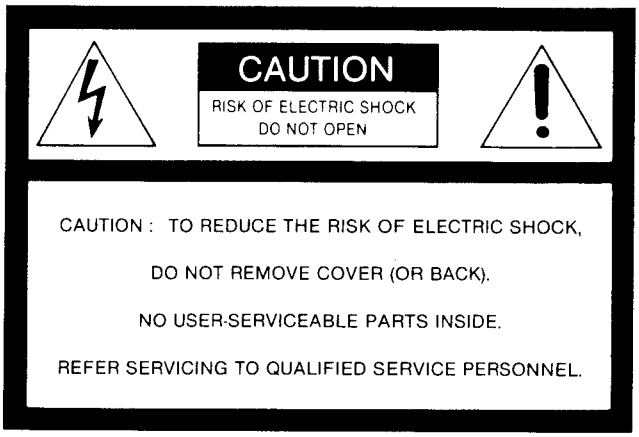
The model and serial numbers are located at the rear. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

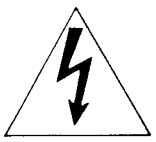
Model No. VO-9600 Serial No. _____

Caution
Television programmes, films, video tapes and other materials may be copyrighted.
Unauthorized recording of such material may be contrary to the provisions of the copyright laws.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION : TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a computing device pursuant to Subpart J of Part 15 of FCC rules.

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GENERAL

High-quality picture with a new recording/playback system
Recording and playback using the newly developed SP (Superior Performance) system and SP tapes specially designed for the SP system, provide clearer and sharper pictures than before.

Hi-Fi sound
Dolby NR* C type noise reduction system permits high-performance audio recording/playback with reduced noise (With Dolby NR on. S/N 70dB with KSP or KSP-S tape).
Cannon 3-pin connectors usually used for professional audio equipment are employed for the audio inputs and outputs.

* Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.

"DOLBY" and the double-D symbol ⊡⊡ are trademarks of Dolby Laboratories Licensing Corporation.

RS-232C interface
A simple circuit board replacement provides an RS-232C interface, which permits remote control operations from an optional search control unit, such as the Sony RX-707, or a computing device with an RS-232C interface capability.

Search operation
Governed by the search dial, playback pictures can be viewed at various speeds from 1/30 times to 5 times normal speed as well as in a still mode.
As the playback can be performed in both forward and reverse directions, any desired scene can be easily found.

LED time counter
The time counter reads out the CTL signals recorded on a tape and the LEDs indicate the tape running time in seconds and minutes. These are useful to check the recording time of a material and the remaining time of a tape.
When a tape on which frame codes have been recorded is played with an optional BKU-701 computer interface board attached to this unit, the time counter shows the current tape position in frame codes (absolute address).

Programmed operation
Programmed operation allows you to easily locate a desired point on a tape and also to repeatedly play back a desired portion.

Connection of a time base corrector
The best possible playback picture will be obtained by connecting a time base corrector.

Automatic control of video recording level
The automatic gain control (AGC) circuit maintains the proper video level assuring optimum video recording.

ABOUT FRAME CODES

By using an optional FCG-700 frame code generator, each recorded picture frame can be numbered sequentially. These continuous numbers are called "frame codes". Recording the frame codes along with the picture means that each recorded picture frame has its own frame code. Thus, any desired picture can be easily and precisely found by referring to its frame code.
To read out the frame codes, the VO-9600 requires an optional BKU-701 computer interface board. Installation of the BKU-701 must be done by service personnel. For installation, consult your Sony dealer.

The ⅄Ⅎ mark found on the rear of the unit is a trademark of Faroudja Laboratories Inc.

PRECAUTIONS

On safety

- Operate the unit only with a power source specified in the "SPECIFICATIONS" on page 40.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it is not to be used for an extended period of time. To disconnect the cord, pull it out by the plug. Never pull the cord itself.

On installation

- Allow adequate air circulation to prevent internal heat buildup. Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation slots.
- Do not install the unit near a heat source such as a radiator or an air duct, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- The unit is designed for operation in a horizontal position. Never operate the unit in a vertical position.
- Keep the unit away from equipment with strong magnets as for example a large loudspeaker.

On operation

- When the unit is not in use, turn the power off.
- Remove and store video cassettes after recording or playback.
- Never operate the unit right after having transported it from a cold location directly to a warm location.

On cleaning

Clean the cabinet, panel and controls with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzine, which might damage the finish.

On transportation

- Remove the video cassette when transporting the unit.
- Save the original carton and associated packing material.

They will be useful should you have to transport or ship the unit.

If you have any questions about this unit, contact your Sony dealer.

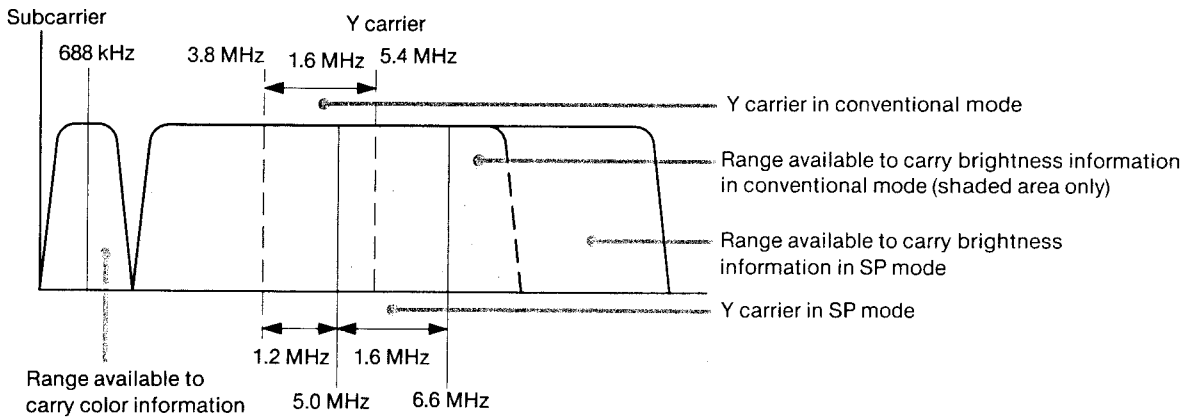
NEW RECORDING/PLAYBACK SYSTEM (SP SYSTEM)

The SP (Superior Performance) system was designed to preserve full interchangeability with conventional U-matic system VTRs.
In the SP mode, Y (luminance) carrier frequencies which carry information on brightness are shifted up about 1.2 MHz, creating a wider bandwidth to be used for recording and playback (below), and consequently making possible a higher quality picture.
To take full advantage of the SP system, a new SP series cassette tape has been developed with a higher frequency response than those of conventional U-matic tapes. SP recording and playback with this new tape provide a sharp and clear picture with minimal color blurring.

INTERCHANGEABILITY OF SP AND CONVENTIONAL RECORDINGS

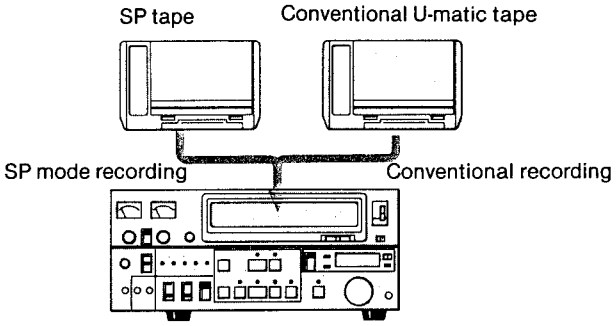
The Chroma subcarrier frequency which carries information on colors is kept unchanged at 688 kHz. Although the frequencies of the Y carrier are shifted up 1.2 MHz, the deviation is kept unchanged at 1.6 MHZ.

This means recording and playback in the conventional mode is also possible simply with the automatic switching of an internal circuit.

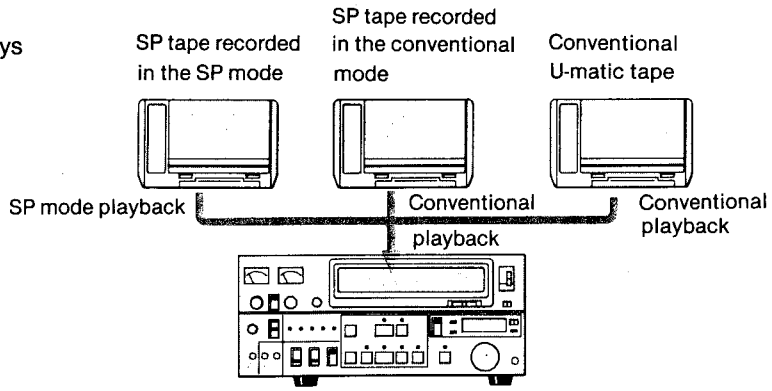


CASSETTE TAPE BEING USED AND AUTOMATIC SWITCHING OF RECORDING/PLAYBACK MODE

When using an SP series cassette tape for recording, the VTR senses the detection holes on the cassette shell (See below), and automatically performs the recording in the SP mode.
When using a conventional KCA and KCS series U-matic tape, the recording is performed in the conventional mode.



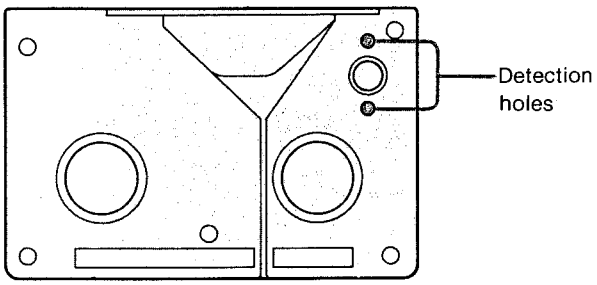
In playback, the VTR can detect the mode used in recording by verifying the recorded signal, and plays back the tape in the appropriate mode.


SP tape recorded in the SP mode
SP tape recorded in the conventional mode
Conventional U-matic tape
SP mode playback
Conventional playback
Conventional playback

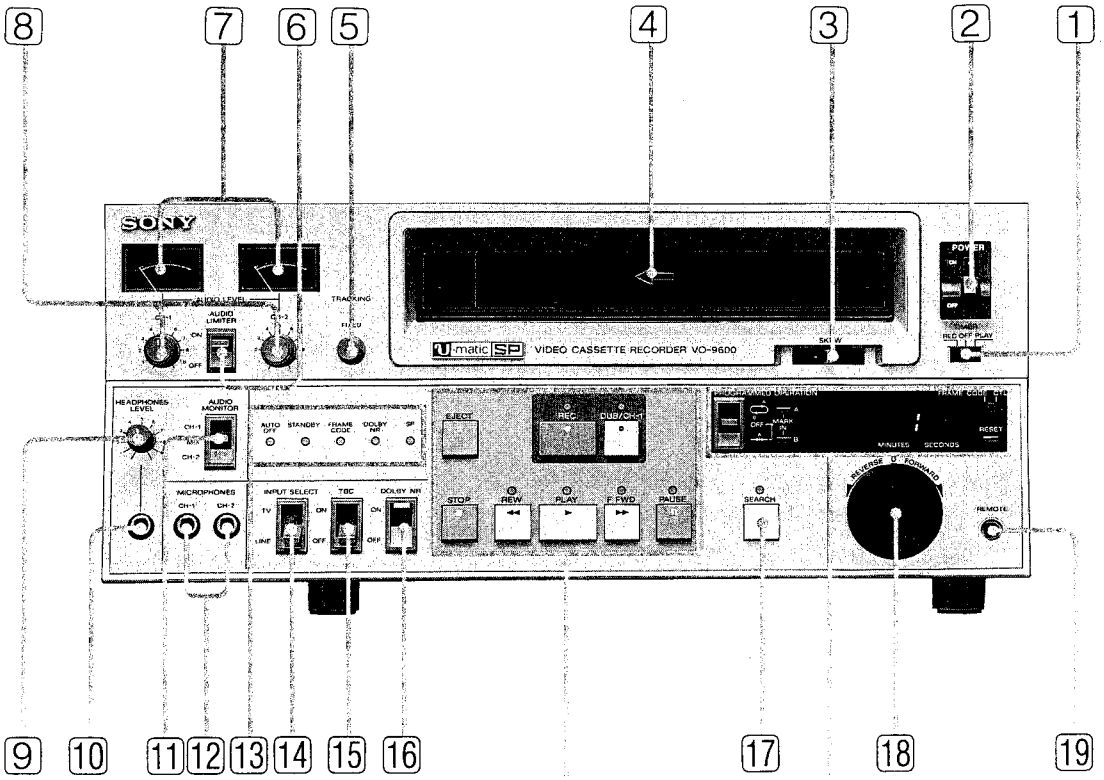
- The SP lamp on the front panel lights when a tape recorded in the SP mode is played back.
- A tape recorded in the SP mode can be played back on a conventional U-matic VTR without difficulty. The picture quality is greatly improved as compared to that recorded in the conventional mode though the complete SP characteristics cannot be obtained.

KSP SERIES U-MATIC CASSETTE TAPE

This new series tape with high durability was specialy developed for SP mode recording/playback and features characteristics best suiting the SP system. SP series cassettes have detection holes on the bottom of the cassette shell to automatically set SP type VTRs in the SP mode recording.



FRONT PANEL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SONY
U-matic SP VIDEO CASSETTE RECORDER VO-9600
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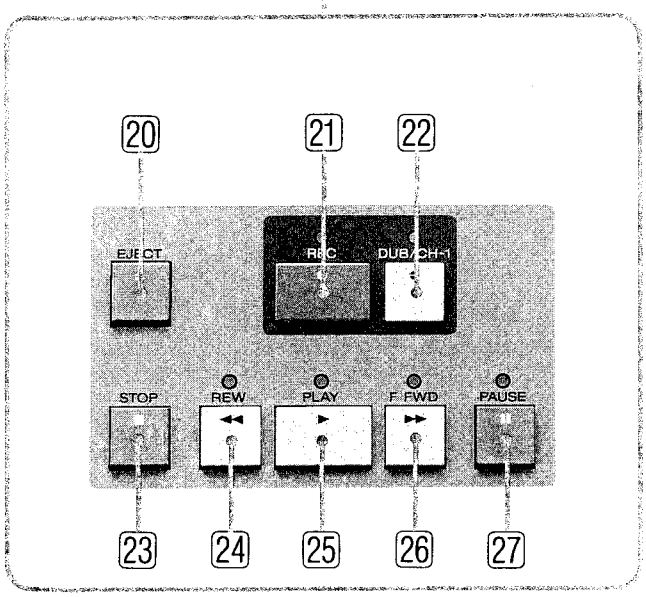
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21
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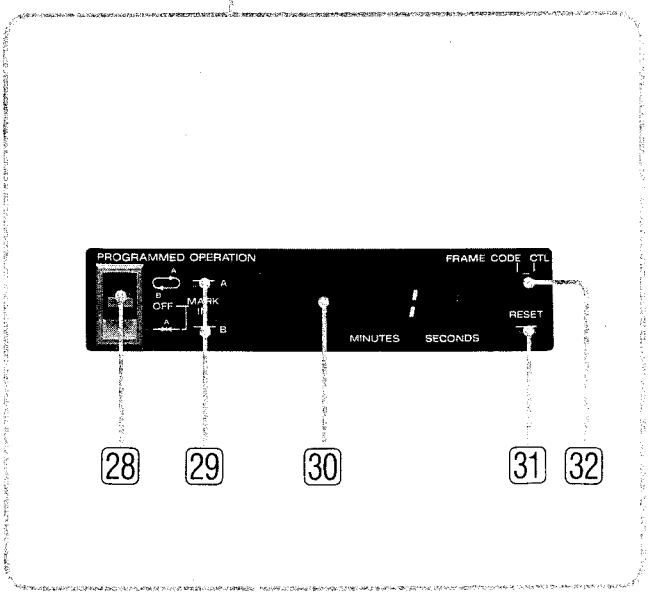
EJECT
REC
DUB/CH-1
STOP
REW
PLAY
F FWD
PAUSE
23
24
25
26
27


PROGRAMMED OPERATION
FRAME CODE CTL
OFF
MARK IN
RESET
MINUTES
SECONDS
28
29
30
31
32

[1] TIMER switch (page 33)
For automatic recording and playback using an optional timer.
Set this switch to OFF when no timer is used.

[2] POWER switch

[3] SKEW lever (page 26)
Normally set this lever at the center position.
When "hooking" distortion appears in the upper part of a playback picture, slide this lever to the right or left to obtain a normal picture.
• Do not move this lever while recording.

[4] Cassette compartment

[5] TRACKING control (page 26)
Normally set this control at the center FIXED position. Should noise, snow or streaks appear in a playback picture recorded on another machine, turn this control so that the best possible picture is obtained.
• Do not move this control from the center FIXED position while recording.

[6] AUDIO LIMITER switch

ON	The audio recording limiter circuit is activated to minimize sudden surges of input signals and perform recording with low sound distortion. Microphone recordings shall be performed with this setting.
OFF	The limiter circuit is deactivated, enabling a manual recording level adjustment.

[7] Audio level meters
Audio recording level is shown in recording and audio playback level in playback.

[8] AUDIO LEVEL controls

[9] HEADPHONES LEVEL control

[10] HEADPHONES connector (stereo phone jack)

[11] AUDIO MONITOR switch (page 21)
Select the sound to be monitored through headphones or a speaker of a video monitor.

[12] MICROPHONES CH-1 and CH-2 connectors (phone jacks)

[13] Indicator section

AUTO OFF	Lights at power-on when moisture is condensed inside the unit. While this indicator is lit, any cassette cannot be loaded.
STANDBY	Lights while a tape is being threaded from or unthreaded to the cassette inside the unit.
FRAME CODE	Lights when a tape on which frame codes have been recorded is played back or when a video signal with frame codes is in an E-to-E mode, with a BKU-701 attached to this unit.
DOLBY NR*	In recording: Lights when an SP series cassette is inserted with the DOLBY NR switch set at ON. In playback: Lights when a tape recorded with the Dolby NR system is played.
SP**	In recording: Lights when an SP series cassette is loaded. In playback: Lights when a tape recorded in SP mode is played back.

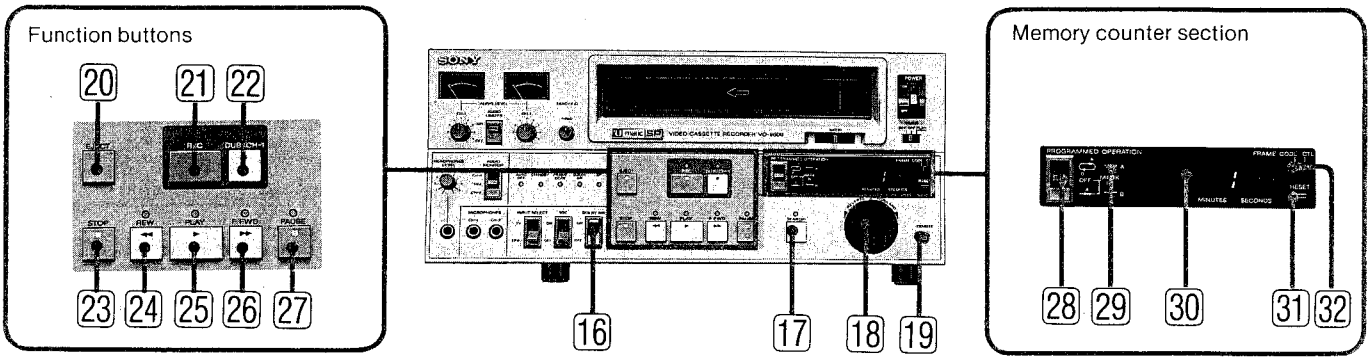
* When the power is turned on with the DOLBY NR switch set at ON, the DOLBY NR lamp lights up even if no cassette has been inserted.
** When the power is turned on, the SP lamp lights up even if no cassette has been inserted.

[14] INPUT SELECT switch
Select a signal to be recorded.

TV	When recording a signal connected to the 8-pin TV connector.
LINE	When recording a signal connected to the BNC type VIDEO IN and the XLR 3-pin AUDIO IN connectors.

[15] TBC (time base corrector) switch

ON	For playback using a time base corrector.
OFF	For playback without using a time base corrector.



16 DOLBY NR (noise reduction) switch
When using an SP series tape for recording, set this switch to;

ON	For recording the sound with the Dolby NR system.
OFF	For recording the sound without the Dolby NR system.

- This switch has no effect in playback mode. The circuit is automatically switched by detecting whether the tape being played has been recorded with the Dolby NR system or not.
- The Dolby NR system is effective only for recording on SP series cassettes. This switch is not operative when recording on KCA and KCS cassettes.

17 SEARCH button/lamp
Press to engage the search dial. The lamp will light.

18 Search dial
By turning this dial with the SEARCH button depressed, the playback speed can be varied from 1/30 to 5 (1/30, 1/10, 1/5, 1/2, 1, 2, and 5) times normal speed. Clockwise rotation (to FORWARD) makes the tape run forwards and counterclockwise rotation (to REVERSE) makes it run backwards. At the center "0" position, the picture will be still.

19 REMOTE connector(special minijack)
Accepts an optional RM-690 remote control unit. Recording, playback, fast forward, rewind and search (with 5 times speed) operations can be remotely controllled.

Function buttons

20 EJECT ⏏ button

21 REC ● (recording) button/lamp
For recording, press this button simultaneously with the PLAY ▶ button.

22 DUB/CH-1 ⊖ (audio dubbing) button/lamp
For adding sound to a tape on which video signal has been previously recorded, press this button simultaneously with the PLAY ▶ button. The sound will be recorded on audio channel 1.

23 STOP ■ button

24 REW ◀◀ (rewind) button/lamp

25 PLAY ▶ (playback) button/lamp

26 F FWD ▶▶ (fast forward) button/lamp

27 PAUSE ❚❚ button/lamp

Memory counter section

28 PROGRAMMED OPERATION switch

A B	For repeatedly playing a particular portion or for checking the point memorized by the MARK IN A and B buttons.
OFF	For normal operation without using any programmed operation. (When the unit is to be controlled from a remote control unit connected to the REMOTE connector, be sure to set this switch to OFF.) Or for memorizing points on the MARK IN A and B buttons for a programmed operation.
A	For locating a point memorized with the MARK IN A button. • If no point is memorized, the tape stops at the point indicated by "0" on the time counter.

[29] MARK IN A and B buttons

Press to memorize the time counter value at that point. You can memorize only one point on each button. If the button is pressed several times, only the last point will be memorized.

When a tape on which frame codes have been recorded is used with an optional BKU-701 attached to this unit, two kinds of data, one CTL and one frame code, can be memorized on each button by changing the FRAME CODE/CTL switch setting.

[31] RESET button

This button has the following three functions.

Clearing the time counter indication

The time counter indication will be set to "0" when this button is pressed.

When a BKU-701 is attached, the time counter indication will be set to "0" when this button is pressed with the FRAME CODE/CTL switch set at CTL.

Clearing the memorys on the MARK IN A and B buttons

When the PROGRAMMED OPERATION switch is set at OFF or →|A|←, the points memorized by the MARK IN A and B buttons will be cleared and "0" will be memorized on both buttons, when the RESET button is pressed.

When the BKU-701 is attached, perform this operation after setting the FRAME CODE/CTL switch to CTL.

Displaying the rotation time of the head drum

When this button is kept pressed for more than 2 seconds with the PROGRAMMED OPERATION switch set at A/B, the duration of the head drum rotation will be indicated in fifties of hours on the time counter.

[30] Time counter

[32] FRAME CODE/CTL switch

Selects the time counter indication. See below.

When no BKU-701 is attached

In recording and playback

FRAME CODE/CTL switch setting	Time counter indication
CTL	Tape running time in seconds and minutes (Relative address indication)
FRAME CODE	

When a BKU-701 is attached

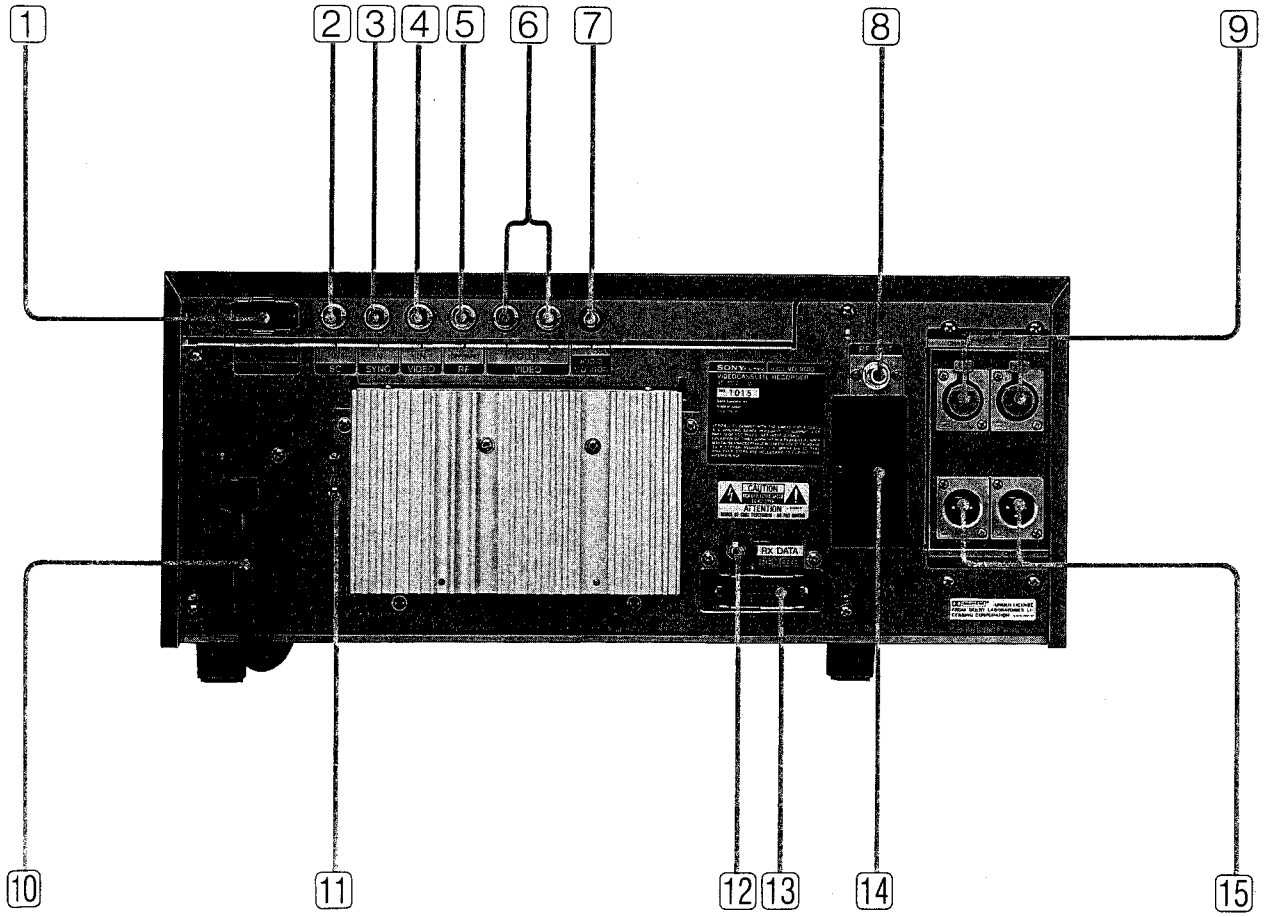
In recording and playback of the video signal in which frame codes have been inserted

FRAME CODE/CTL switch setting	Time counter indication
FRAME CODE	Frame code numbers (Absolute address indication)
CTL	Tape running time in seconds and minutes (Relative address indication)

In recording and playback of the video signal in which no frame code has been inserted

FRAME CODE/CTL switch setting	Time counter indication
FRAME CODE	Frame numbers obtained by counting and converting the CTL signals
CTL	Tape running time in seconds and minutes

REAR PANEL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SYNC
VIDEO
RF
VIDEO
SONY
1015
CAUTION
ATTENTION
RX DATA

[1] **TV (monitor) connector (8-pin connector)**
Accepts a video monitor having an 8-pin VTR connector. All the VIDEO IN, VIDEO OUT, AUDIO LINE IN and AUDIO LINE OUT connections can be replaced with a single cable connection here. When this connector is used, audio signal will be recorded on audio channel 2 only. In playback, the channel selected by the AUDIO MONITOR switch will be heard through the speaker on the video monitor.

[2] **SC IN (sub-carrier) connector (BNC type)**
Accepts a sub-carrier signal from a time base corrector.

[3] **SYNC IN (sync signal input) connector (BNC type)**
Accepts an external sync signal to operate the unit in syncronization with an external device (time base corrector, etc.).

[4] **VIDEO IN connector (BNC type)**

[5] **RF (OFF TAPE) output connector (BNC type)**
Supplies an FM signal to a time base corrector in playback.

[6] **VIDEO OUT 1 and 2 connectors (BNC type)**

[7] **AUDIO MONITOR output connector (phono jack)**
Supplies an audio signal selected at the AUDIO MONITOR switch on the front panel.

[8] **RF OUT connector (F type)**
Feeds out video and audio signals as a modulated TV signal. Connect it to the antenna terminal of a TV receiver.

[9] **AUDIO LINE IN CH-1/L and CH-2/R connectors (XLR 3-pin, female)**

[10] **AC power cord**

[11] **Ground terminal**

[12] **RX DATA connector (minijack)**
For recording data or reading recorded data by an RX-353 or RX-303 auto search control unit.

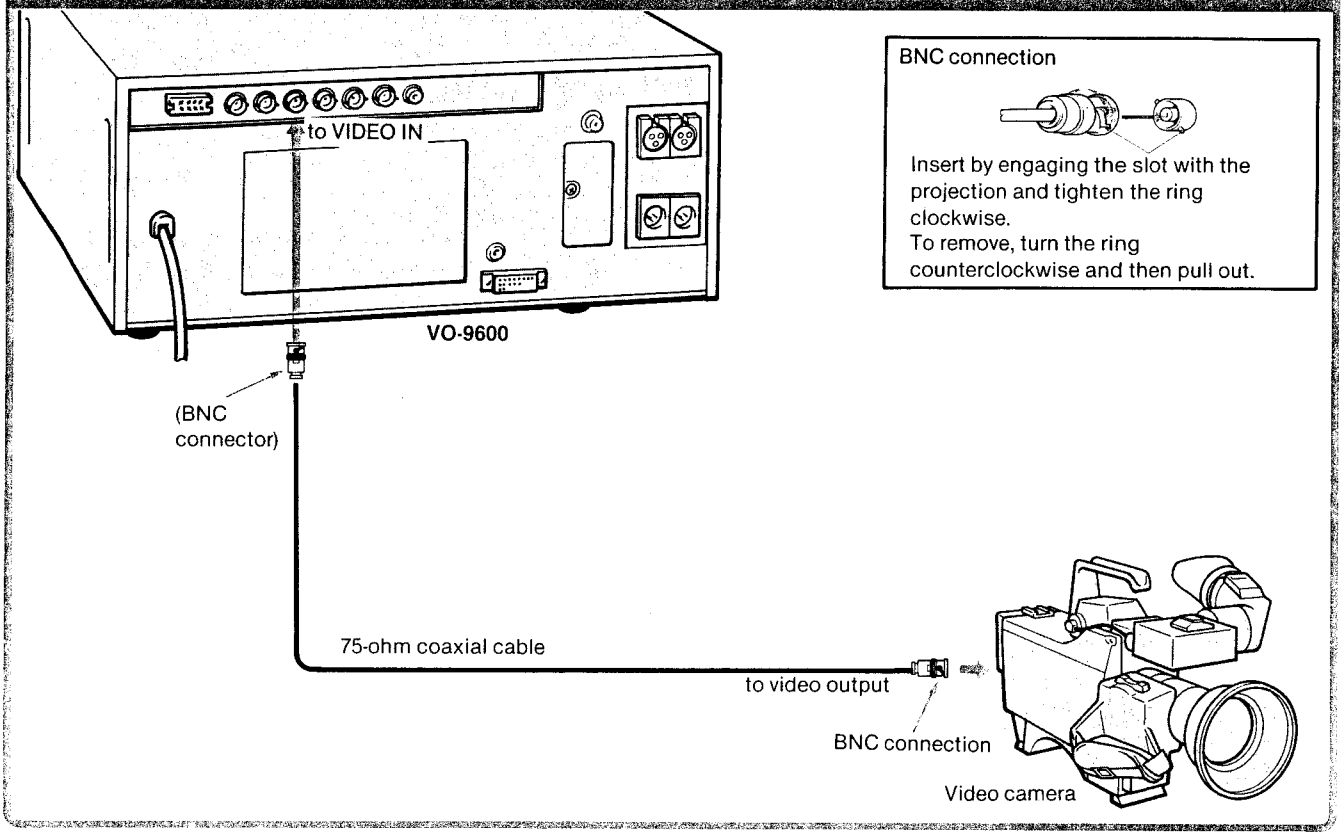
[13] **REMOTE connector (33-pin)**
Connect an optional editing control unit, auto search control unit, or remote control unit to remotely control the recorder.
- Before connecting a remote control cable, check whether the connector is male or female.
- A 20-pin connector can also be connected without using any plug adaptor.

[14] **RF modulator compartment**
Insert an optional RF modulator here to monitor playback picture and sound on a TV receiver. (A compartment cover is supplied with this unit.)
* An RF modulator converts the video and audio signals read out from a tape into a TV signal on VHF channel 3 or 4.

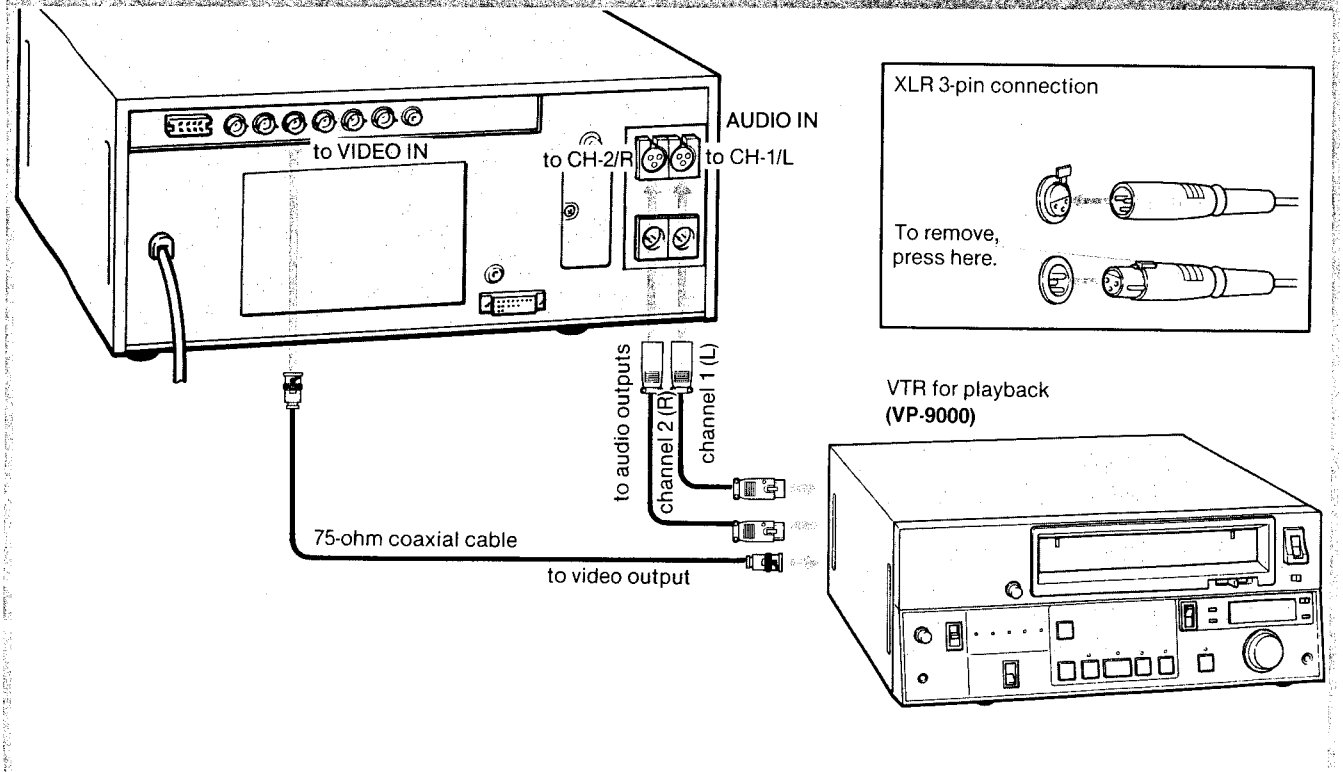
[15] **AUDIO LINE OUT CH-1/L and CH-2/R connectors (XLR 3-pin male)**

CONNECTIONS

FOR CAMERA RECORDING

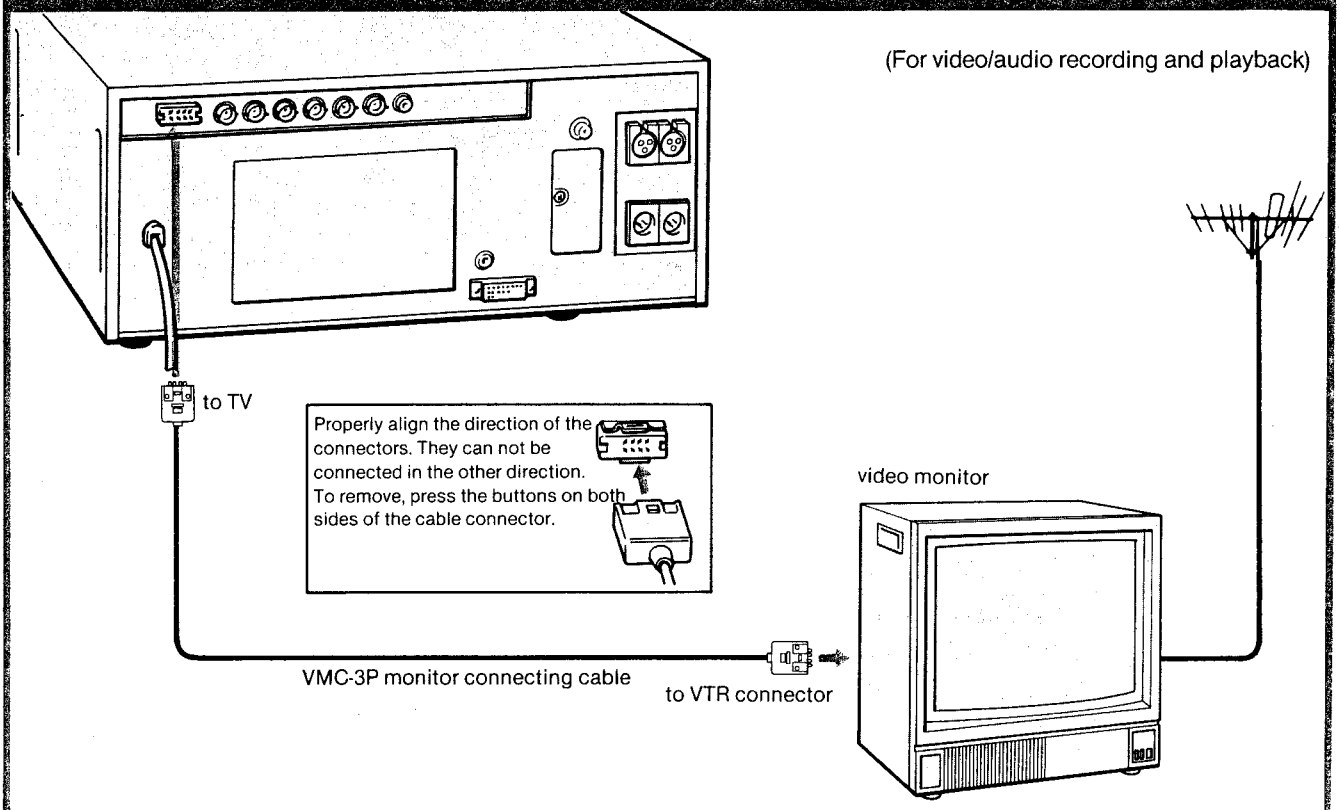

to VIDEO IN
VO-9600
(BNC connector)
75-ohm coaxial cable
to video output
BNC connection
Video camera
BNC connection
Insert by engaging the slot with the projection and tighten the ring clockwise.
To remove, turn the ring counterclockwise and then pull out.

FOR TAPE DUBBING



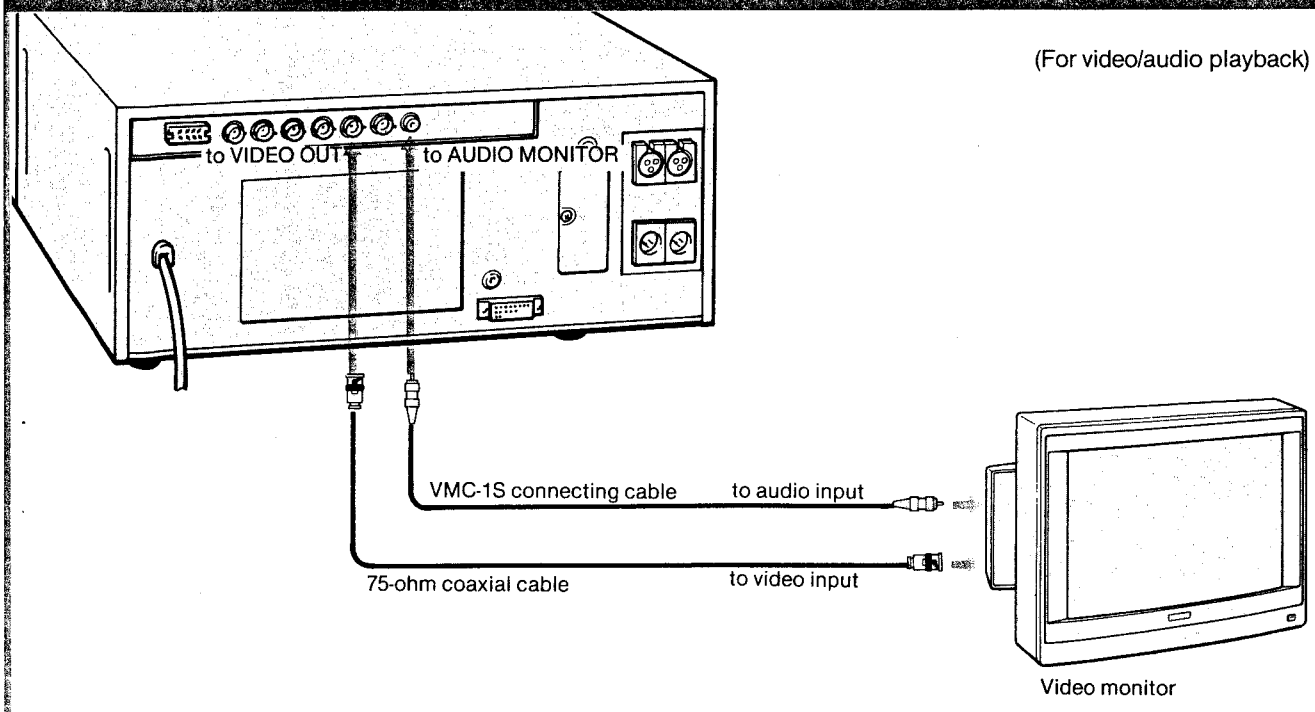
FOR CONNECTING A VIDEO MONITOR WITH AN 8-PIN VIDEO CABLE

(For video/audio recording and playback)


to TV
Properly align the direction of the connectors. They can not be connected in the other direction. To remove, press the buttons on both sides of the cable connector.
video monitor
VMC-3P monitor connecting cable
to VTR connector

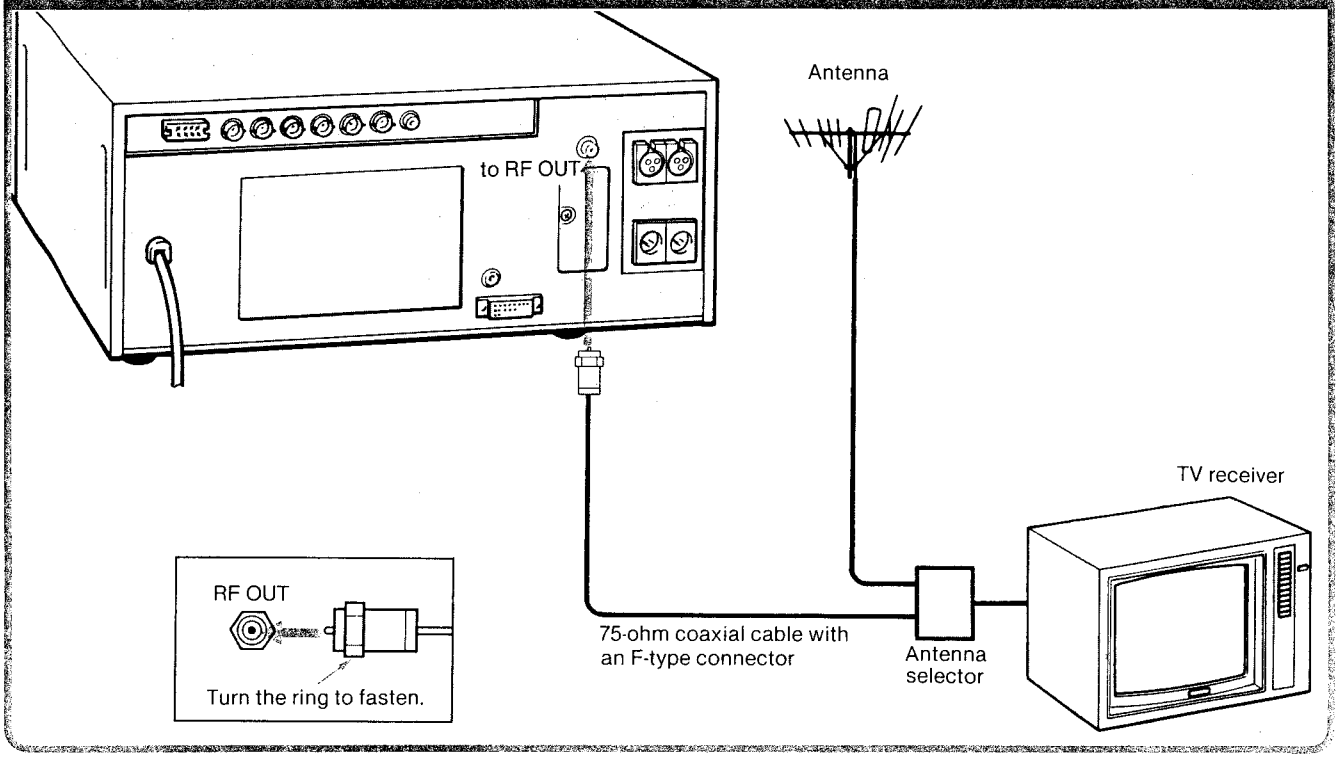
FOR CONNECTING A VIDEO MONITOR NOT HAVING AN 8-PIN VTR CONNECTOR

(For video/audio playback)

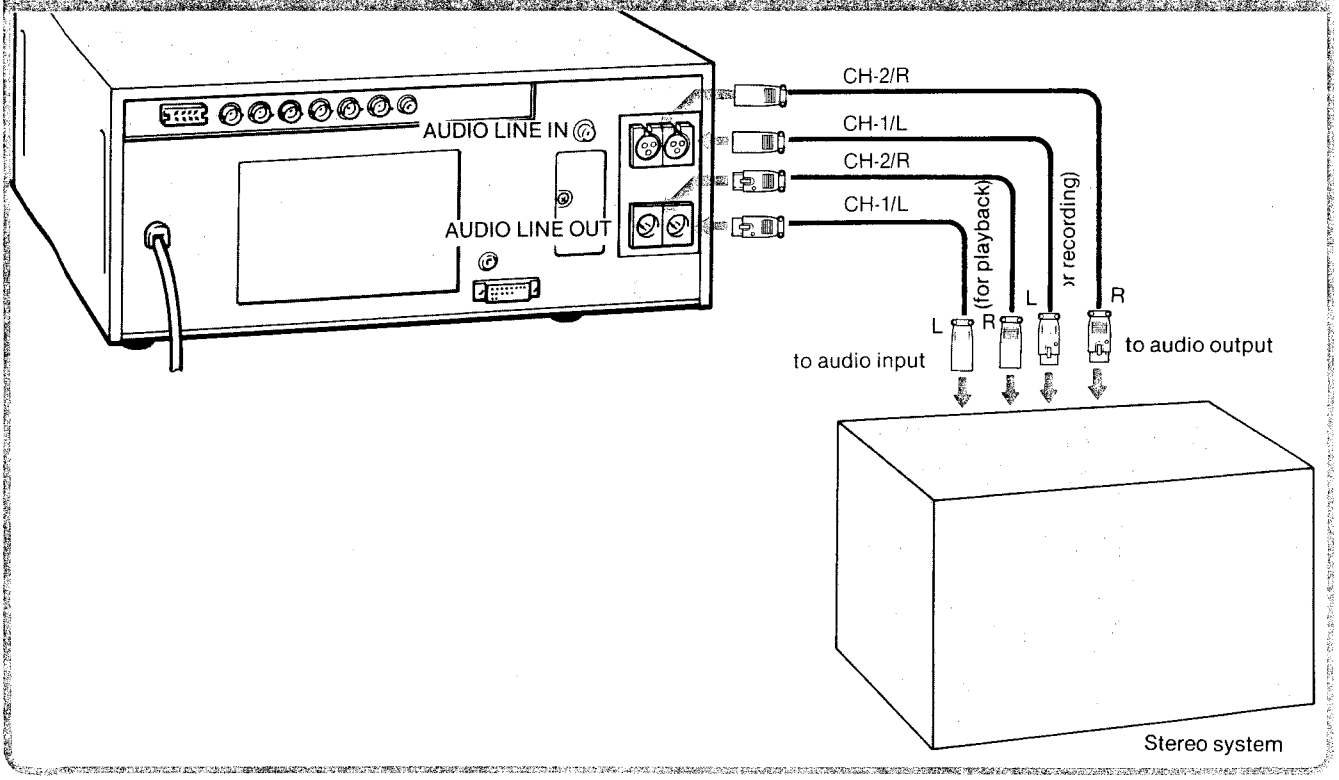


FOR CONNECTING A TV RECEIVER (For video/audio playback)

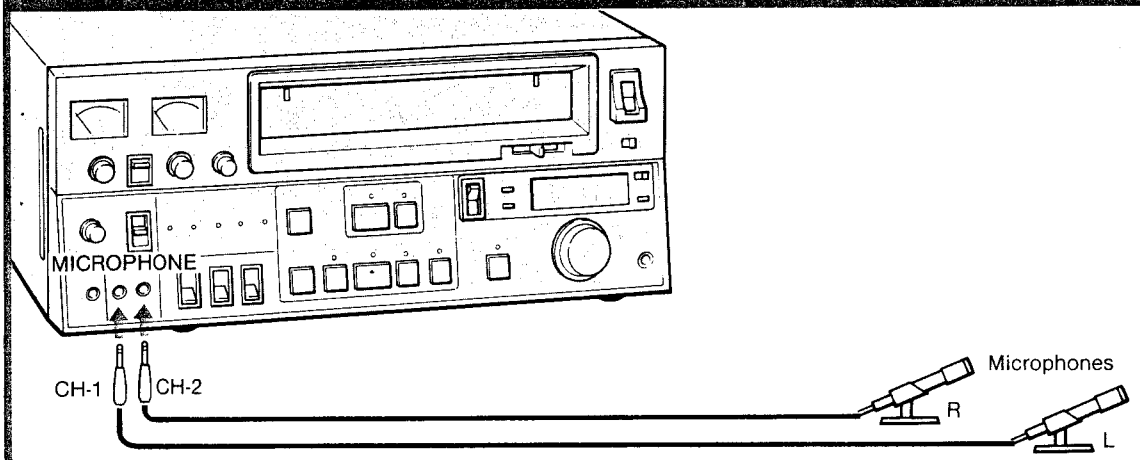
For details, see page 34



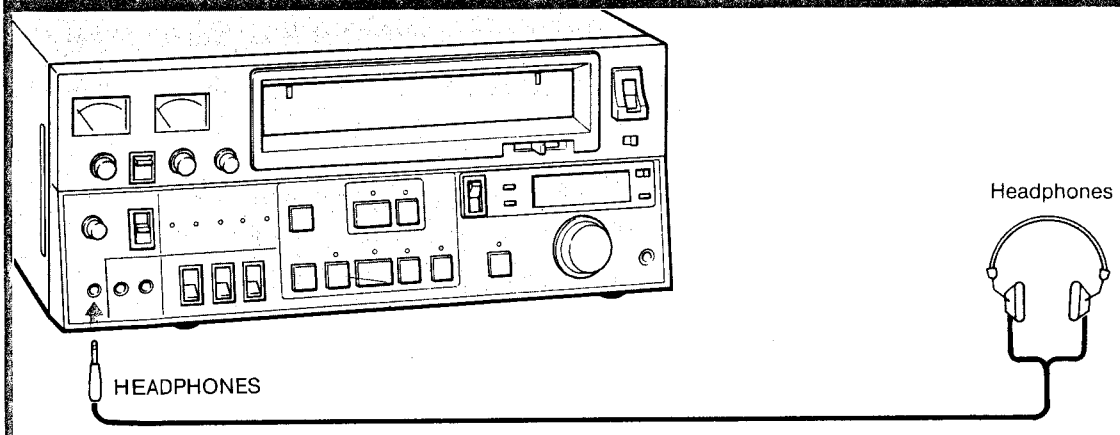
FOR CONNECTING A STEREO SYSTEM (For audio recording and playback)



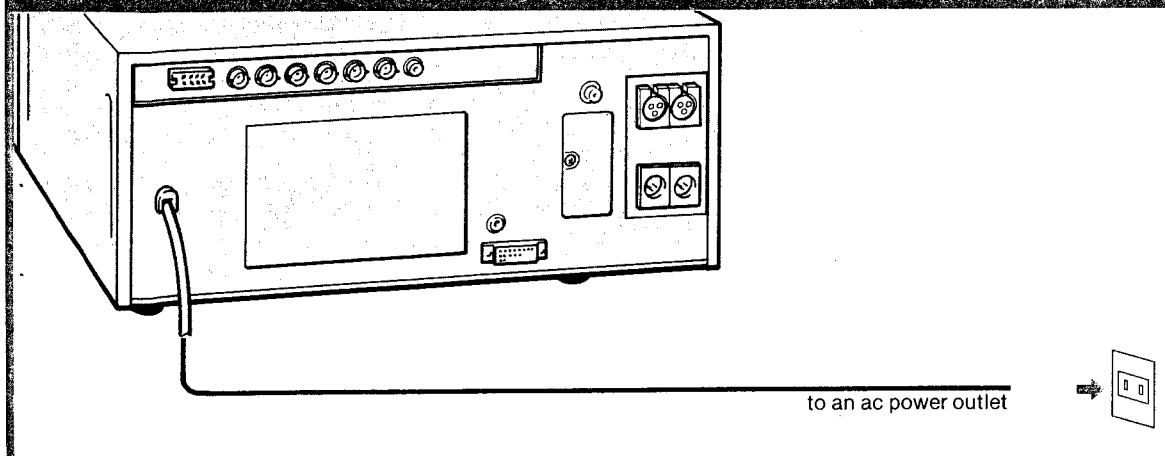
FOR MICROPHONE RECORDING



FOR SOUND MONITORING THROUGH HEADPHONES

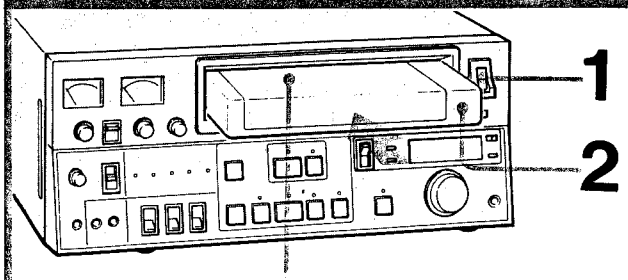


POWER CONNECTION



ON VIDEO CASSETTES

TO INSERT A CASSETTE

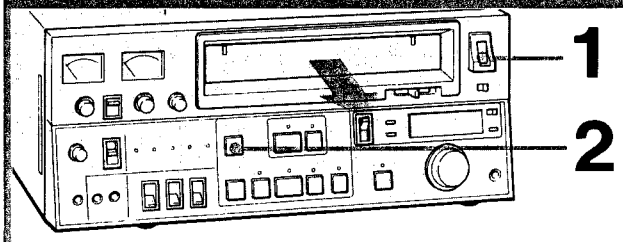


with the label side up

1 **Turn the power on.**

2 **Insert the cassette into the cassette compartment.**
The STANDBY lamp will light and the cassette will be automatically pulled in. When the cassette is completely pulled in, the lamp goes off.

TO REMOVE THE CASSETTE



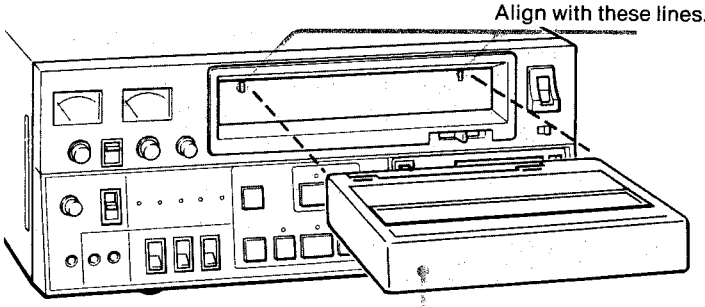
1 **Make sure that the power is turned on.**

2 **Press the EJECT ⏏ button.**
The STANDBY lamp once lights up. When the lamp then goes off, the cassette will be ejected.

Caution
Do not put your hand into the cassette compartment when removing a cassette.

TO INSERT A SMALL-SIZE (KSP-S OR KCS) CASSETTE

Insert the cassette into the center of the cassette compartment, aligning it with the dotted lines on the compartment lid.

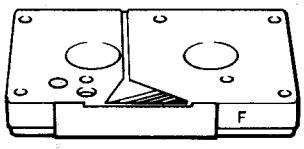


KSP-S or KCS cassette

Notes on cassette insertion
- Be sure to insert the cassette straight into the entrance of the compartment.
- Check the cassette sides and be sure to insert the cassette correctly with the label side up.
- The labels on the cassette should be firmly attached. If they peel off an inserted cassette, you might not be able to remove the cassette.

If the STANDBY lamp remains lit after inserting a cassette
- Turn the POWER switch off and then turn it on again.
- If the STANDBY lamp still remains lit, eject the inserted cassette.
  If the cassette cannot be ejected or if the STANBY lamp still remains lit after the cassette is ejected, then consult your nearest Sony service facility.

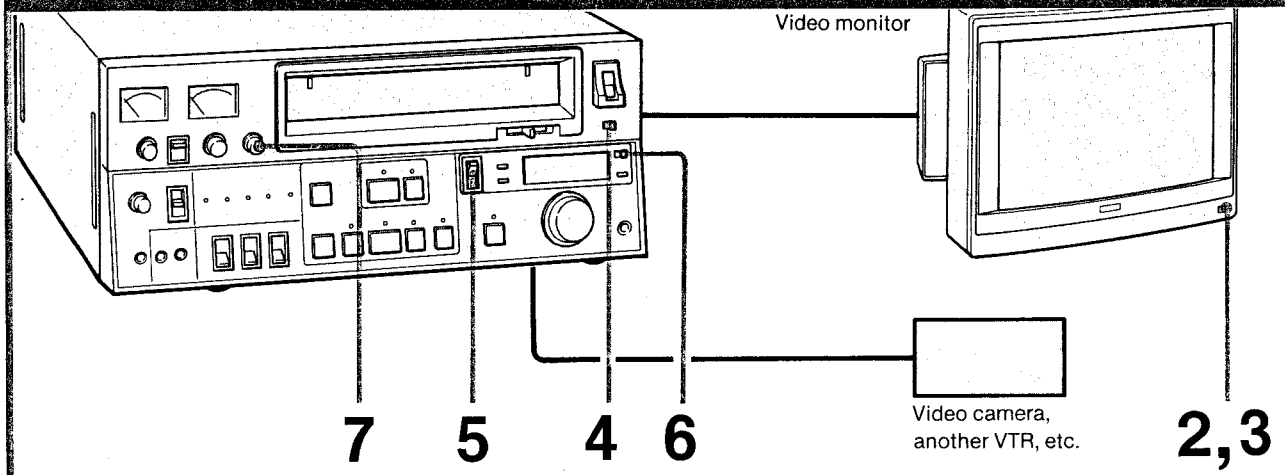
About the red button
When re-recording on a recorded tape, th pre-recorded material will be automatically erased. If you want to safeguard the material recorded on a tape, remove the red button on the bottom of the cassette. With the red button removed, it cannot be recorded even if the REC button is pressed. Accidental erasure is now impossible. When recording, check the red button is in the place. If a cassette without a red button is inserted, an E-to-E mode picture (see page 21) does not appear on the monitor screen.



Red button

Handling and storage of cassettes
- Do not store a cassette in a place subject to direct sunlight, high humidity or excessive dust, or near heat sources, air ducts or magnetic field.
- After use, rewind the tape evenly on the supply reel to avoid damaging the tape.
- Store the cassette in a case and keep it in a vertical position.
- Do not fall the cassette and avoid subjecting it to mechanical shock.

PREPARATIONS



1 **Perform the necessory connections.**

2 **Turn on the video monitor.**

3 **In accordance with the VTR connection, set the input selector of the video monitor to;**

VTR	when the 8-pin VTR connector is used.
LINE	when the video input connector is used.

4 **Set the TIMER switch to OFF.**

5 **Set the PROGRAMMED OPERATION switch to OFF.**

6 **Select the Time counter indication with the FRAME CODE/CTL switch according to the table of page 11.**

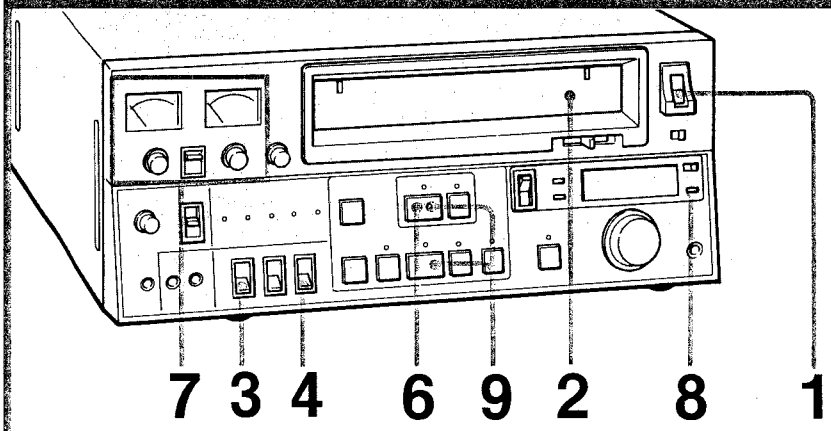
7 **Set the TRACKING control to FIXED.**

SP mode recording
When a KSP or KSP-S cassette is used, the recorder automatically selects the SP mode. For KCA or KCS cassettes, the conventional mode will be selected.

Automatic video recording level adjustment
The built-in AGC circuit automatically adjusts the video recording level to the optimum value.

Dolby NR audio recording
Dolby NR system is effective only when a KSP or KSP-S cassette is used. Dolby NR recording is not possible on KCA and KCS cassettes.

OPERATION



1 **Press the ON side of the POWER switch to turn on the power.**

2 **Insert a cassette.**

3 **Set the INPUT SELECT switch to;**

TV	when recording a TV program with the video monitor connected to the 8-pin TV conector.
LINE	when recording a signal from a camera or a VTR, or a TV program with a video monitor connected to the VIDEO IN connector.

4 **When an SP cassette is used, set the DOLBY NR switch to;**

ON	when recording using the Dolby NR system.
OFF	when recording without the Dolby NR system.

5 **Prepare the program to be recorded.**

For TV program recording	select the desired channel on the video monitor.
For camera recording	set up the camera.
For tape dubbing	set the playback machine into playback mode.

6 **Press the REC ● button.**
An E-to-E mode picture appears on the monitor screen.

To stop the tape momentarily
Press the PAUSE button. To resume recording, press the PAUSE button again.

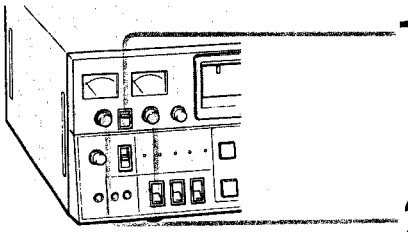
Long pause mode
If the pause mode continues for more than 8 minutes, the tape around the head drum automatically slackens to protect the video head and the tape. This is called "long pause mode".
To release the long pause mode, press the PAUSE button.

When recording is finished
Press the STOP ■ button.

If the recording is done to the end of a tape
The tape automatically rewinds to the beginning and stops.

Note on recording
Do not move the SKEW lever while recording.

7 Adjust the recording level.



1 AUDIO LIMITER switch → OFF

2 Turn the AUDIO LEVEL controls so that the pointers of the level meters swing to "0" at maximum volume.

- Adjust the sound of channel 1(L) with the CH-1 control and that of channel 2 (R) with the CH-2 control.
- When the TV connector is used, the sound will be recorded only on channel 2.
- When recording a program containing sharp peaks, especially in microphone recording, return the AUDIO LIMITER switch to ON.

8 Press the RESET button.

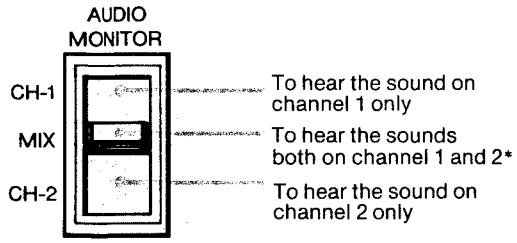
The time counter shows "00:00".

9 Press the REC ● button and the PLAY ▶ button simultaneously.

Recording begins.

TO MONITOR THE SOUND BEING RECORDED

While recording, the sound being recorded can be heard through headphones, audio equipment or a video monitor's speaker. When using headphones or equipment connected to the AUDIO MONITOR connector or the TV connector, set the AUDIO MONITOR switch as follows.


AUDIO MONITOR
CH-1
MIX
CH-2
To hear the sound on channel 1 only
To hear the sounds both on channel 1 and 2*
To hear the sound on channel 2 only

* When stereo headphones are used, the sound of channel 1 will be heard from the left unit and the sound of channel 2 from the right unit. When a monitor speaker connected to the AUDIO MONITOR or TV connector is used, mixing sound of both channel 1 and 2 will be heard.

- The AUDIO LINE OUT CH-1/L and CH-2/R connectors are not affected by the setting the AUDIO MONITOR switch. The CH-1/L connector always outputs the sound on channel 1 and the CH-2/R connector outputs the sound on channel 2.
- The sound volume of the headphones can be adjusted by the HEADPHONES LEVEL control.

If the tape does not run by pressing any of the function buttons

1 Press the EJECT ⏏ button and take out the cassette.
2 Turn the reel to the direction of the arrow on the bottom of the cassette until the leader tape is completely taken up.
3 Insert the casstte again.

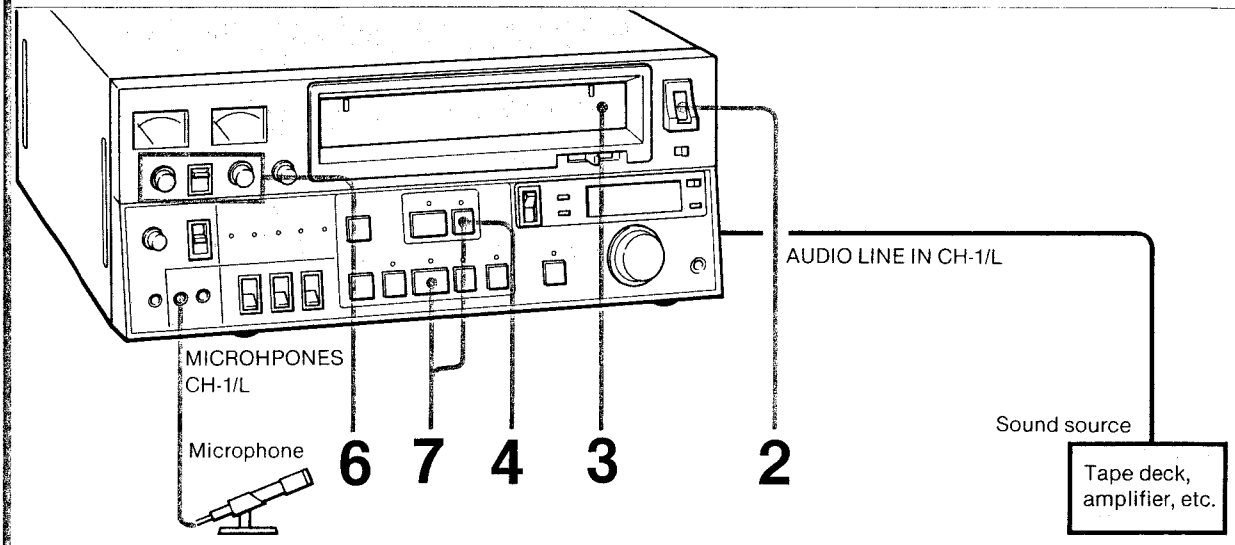
If the cassette cannot be ejected, or if the function buttons are not effective after the above operation, consult your nearest Sony service facility.

E-to-E (Electronics-to-Electronics) mode

An input video signal which has passed the amplifier in the recorder, is displayed on the monitor screen. This is the E-to-E mode picture, permitting the input signal to be checked on the monitor screen,

TO DUB AUDIO

You can add a sound such as music or commentary on a tape on which video signal has already been recorded. The new sound is recorded on audio channel 1. When the new sound is recorded, any previous sound will be erased.



1 **Connect a sound source.**

For microphone recording.	connect a microphone to the MICROPHONES CH-1/L connector.
For recording from a taped program, etc.	connect an appropriate device, as a tape deck or an amplifier, to the AUDIO LINE IN CH-1/L connector.

2 **Turn on the power.**

3 **Insert a recorded cassette.**

4 **Press the DUB/CH-1 ⊖ button.**

5 **Start the sound source.**

6 **Adjust the audio recording level.**

7 **Press the DUB CH-1 ⊖ button simultaneously with the PLAY ▶ button.**
Audio dubbing begins.

TO RECORD SOUND ON THE MIDDLE OF A TAPE

Proceed to step 3 above and then as follows.

1 **Play the tape.**

2 **Press the PAUSE ❚❚ button at the point from which sound is to be added.**
The tape stops momentarily.

3 **Press the DUB/CH-1 ⊖ button.**

4 **Start the sound source.**

5 **Adjust the audio recording level.**

6 **Press the PAUSE ❚❚ button.**
Audio dubbing begins.

ERASING

Recorded material is erased automatically when new material is recorded. To erase recorded material without recording new material, proceed as follows;

1 **Disconnect all input connections to the TV, VIDEO IN, AUDIO LINE IN CH-1/L, CH-2/R and MICROPHONES connectors.**

2 **Checking the red button is in place on the bottom, insert the cassette for erasing.**

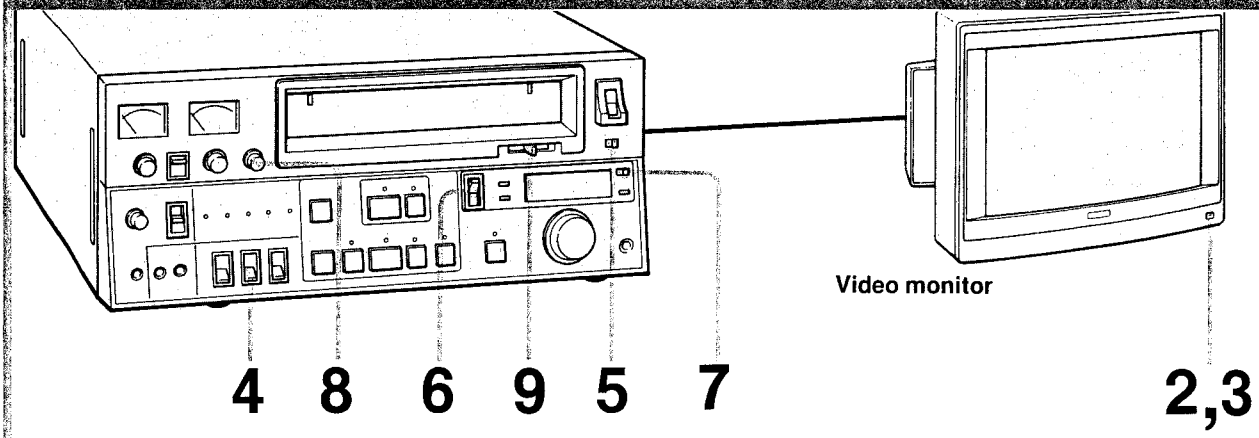
3 **Set the recorder in record mode.**
The video and audio signals on the tape will be erased by running the tape to the end.

Notes

- If both a microphone and another audio source are connected simultaneously, only the sound from the microphone will be recorded.
- Pointing the microphone at the monitor may cause acoustic feedback (a whistle-like sound). Avoid pointing or turn down the sound volume on the monitor.

PLAYBACK

PREPARATIONS



1 **Perform the necessory connections.**

2 **Turn on the video monitor.**

3 **In accordance with the VTR connection, set the input selector of the video monitor to;**

VTR	when the 8-pin VTR connector is used.
LINE	when the video input connector is used.

4 **Then, on the recorder:**
Set the TBC switch to OFF.

5 **Set the TIMER switch to OFF.**

6 **Set the PROGRAMMED OPERATION switch to OFF.**

7 **Select the Time Counter indication with the FRAME CODE/CTL switch (see page 11).**

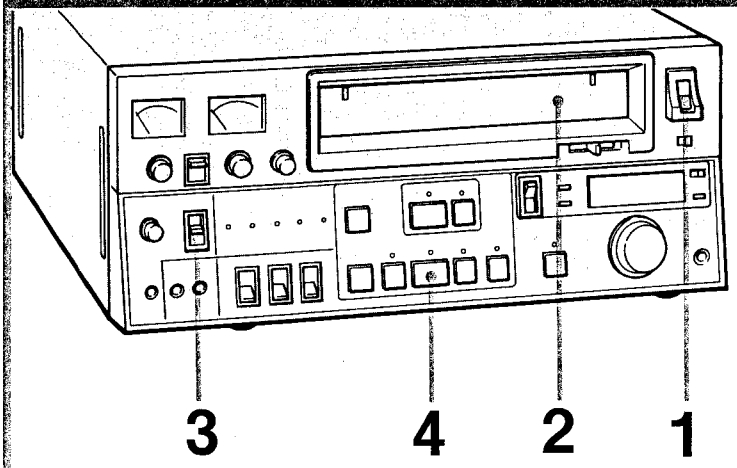
8 **Set the TRACKING control to FIXED.**

9 **Set the SKEW lever to the center position.**

To stop the tape momentarily
Press the PAUSE ❚❚ button. The tape stops and a still picture appears on the monitor screen. The still picture is a clear one having no guardband noise.
To resume playback, press the PAUSE ❚❚ button again or press the PLAY ► button.
- If the pause mode continues for more than 8 minutes, the recorder automatically enters the long pause mode, and the still picture will disappear.

To stop playback
Press the STOP ■ button.

When the tape is played back to the end
It automatically rewinds to the beginning and then stops.



1 **Turn on the power.**

2 **Insert the cassette to be played back.**

3 **Set the AUDIO MONITOR switch to;**

MIX	for normal monitoring.
CH-1	when monitoring only the sound of channel 1.
CH-2	when monitoring only the sound of channel 2.

- This switch has no effect on outputs to the AUDIO LINE OUT connectors.

4 **Press the PLAY ► button.**
Playback begins.

Indicators

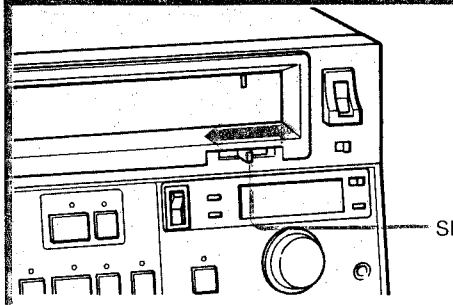
When the DOLBY NR indicator is lit: The tape being played has been recorded using the Dolby NR system.

When the SP indicator is lit: The tape being played has been recorded in the SP mode.

When the FRAME CODE indicator is lit: Frame codes have been recorded on the tape being played. The frame codes can be displayed on the time counter by setting the FRAME CODE/CTL switch to FRAME CODE.

- When the BKU-701 is not attached, frame codes cannot be read out, and the FRAME CODE lamp does not light even if frame codes have been recorded on the tape.

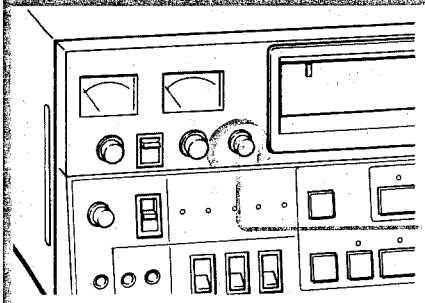
IF A HOOKING DISTORTION APPEARS IN THE UPPER PART OF THE PICTURE



Move the SKEW lever slowly to the right or left until a normal picture is obtained.

- When the playback of this particular tape is finished, be sure to return the SKEW lever to the center position.
- The SKEW lever automatically returns to the center position when the recorder enters the recording mode.

IF SNOW OR STREAKS MAY APPEAR ON THE PICTURE



Slowly turn the TRACKING control clockwise or counterclockwise until the best possible picture is obtained.

- When the playback of this particular tape is finised, be sure to return the TRACKING control to the center FIXED position.

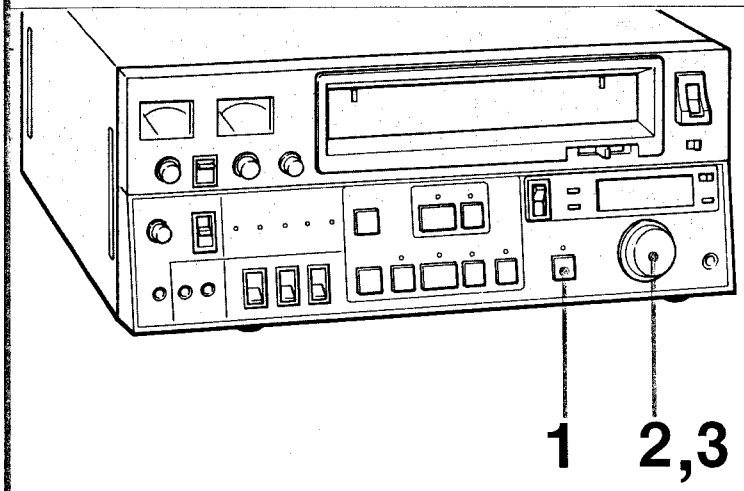
If the tape does not run by pressing any of the function buttons

1 Press the EJECT button ⏏ and take out the cassette.
2 Turn the reel to the direction of the arrow on the bottom of the cassette until the leader tape is completely taken up.
3 Insert the casstte again.

If the casstte cannot be ejected, or if the function buttons are not effective after the above operation, consult your nearest Sony dealer.

SEARCH OPERATION

A desired portion can be quickly located with the search dial.



1 **Press the SEARCH button.**
The lamp lights.

2 **Turn the search dial towards;**

FORWARD (right)	to play in the normal direction.
REVERSE (left)	to play in the reversed direction.

The playback speed varies from 1/30, 1/10, 1/5, 1/2, 1, 2 to 5 times normal speeds according to the dial rotation angle.

3 **Set the dial to the center "0" position at the desired point.**
The tape stops in pause mode and a still picture can be seen on the monitor screen.

Notes

- Guardband noise may flow on the playback picture with a speed other than the normal speed as the servo system is not locked during search operation.
- If the TBC switch is set to ON with no time base corrector connected, the picture does not lock in the search mode and it may roll vertically.

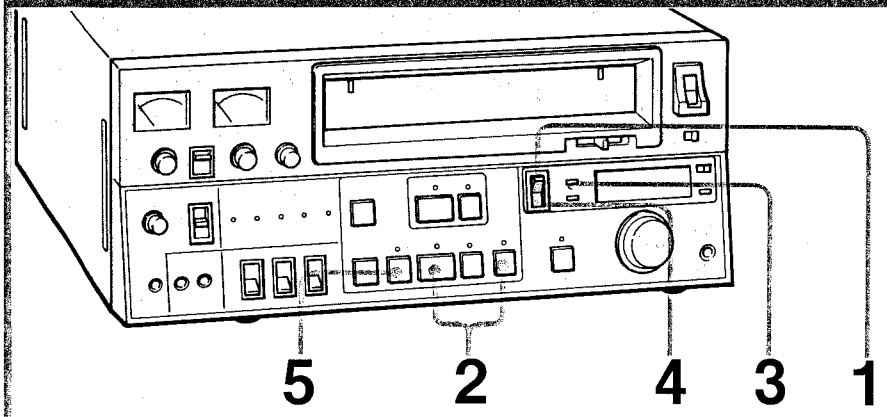
To release the search operation

Press either of the PLAY ▶, REW ◀◀, F FWD ▶▶ or STOP ■ button.

PROGRAMMED OPERATION

Using the MARK IN A and B buttons and the PROGRAMMED OPERATION switch, you can quickly locate a desired point or repeatedly play a particular portion.

TO LOCATE A DESIRED POINT



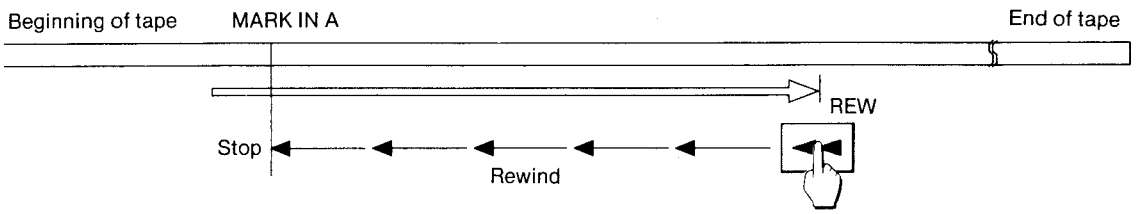
1 **Set the PROGRAMMED OPERATION switch to OFF.**

2 **Play the tape and stop it at the desired point momentarily.**

3 **Press the MARK IN A button.**
Resume the playback.

4 **Set the PROGRAMMED OPERATION switch to →|A|← .**

5 **Press the REW ◀◀ button.**
The tape will stop at the memorized point.



Using the search dial
The search dial can also be used for the programmed oepration in place of the REW ◀◀ button. When the dial is used, the picture can be viewed on the monitor screen while being rewound and a still picture will be obtained when the tape stops.

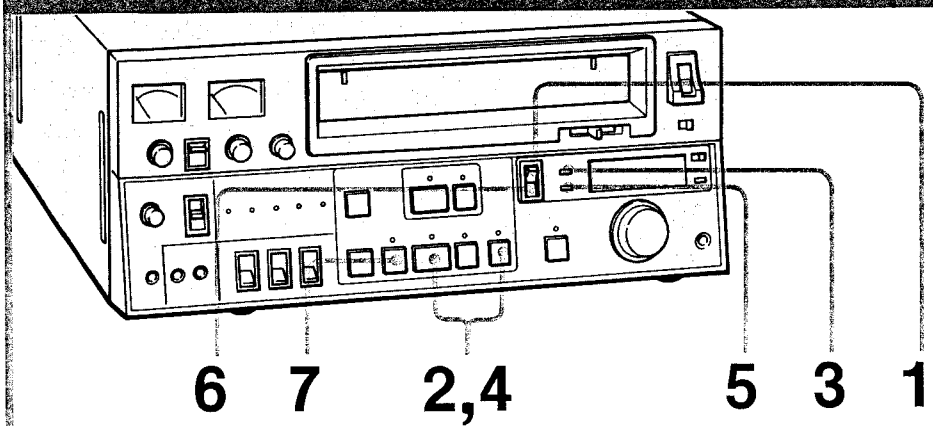
Note
If neither video signal nor CTL signal is recorded for more than 5 seconds after the point which is memorized on the MARK IN B button, the repeat operation is not possible.

To stop the repeat playback
Press the STOP ■ button.

When the programmed operation is finished,
Be sure to return the PROGRAMMED OPERATION switch to OFF.

Note on repeat playback
When the playback is so many times repeated, the portion played back may shift little by little unless the BKU-701 and a tape on which frame codes have been recorded are used.

TO REPEAT A DESIRED PORTION



1 **Set the PROGRAMMED OPERATION switch to OFF.**

2 **Play the tape and stop it momentarily at the point from which the playback is to be started.**

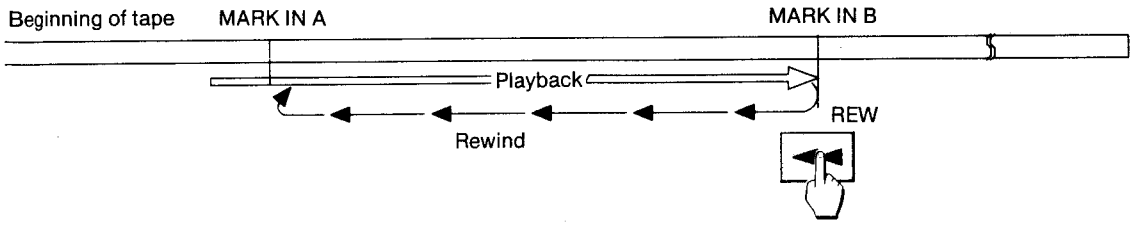
3 **Press the MARK IN A button.**

4 **Search for a point where the playback is to be stopped and stop the tape momentarily at that point.**

5 **Press the MARK IN B button.**

6 **Set the PROGRAMMED OPERATION switch to** $\overset{A}{\underset{B}{\circlearrowright}}$.

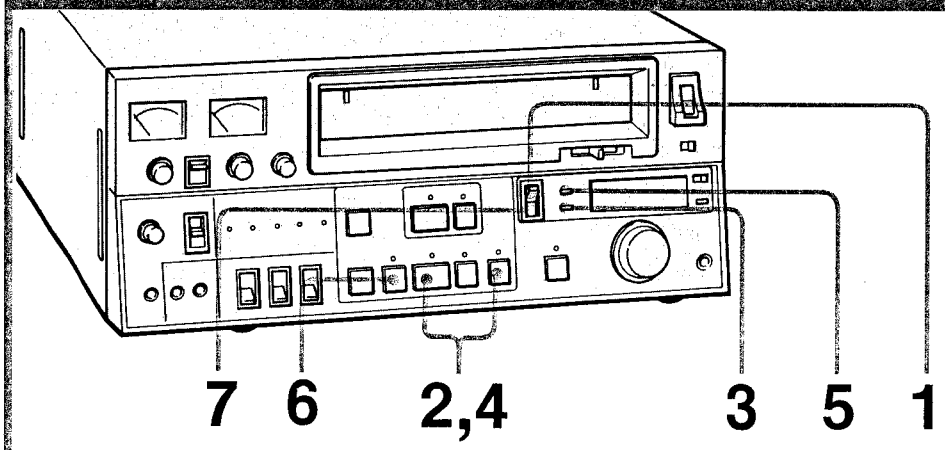
7 **Press the REW ◀◀ button.**
The portion between the points memorized on the MARK IN A and B buttons is repeatedly played back.



To check the memorized points
1 Press the STOP button ■ to stop the tape.
2 Set the PROGRAMMED OPERATION switch to $\overset{A}{\underset{B}{\circlearrowright}}$.
3 Press either the MARK IN A or B button.
The memory on that button will be dislayed on the time counter.

To display the time between two particular points designated for a repeat playback
1 Stop the tape with the STOP button ■.
2 Set the PROGRAMMED OPERATION switch to $\overset{A}{\underset{B}{\circlearrowright}}$.
3 Press the MARK IN A and B buttons simultaneously.
While the buttons are pressed, the time between the designated points will be displayed on the time counter.

TO REPEAT BETWEEN THE BEGINNING OF A TAPE AND A PARTICULAR POINT



1 **Set the PROGRAMMED OPERATION switch to OFF.**

2 **Search for a point where the playback is to be stopped and stop the tape momentarily at that point.**

3 **Press the MARK IN B button.**

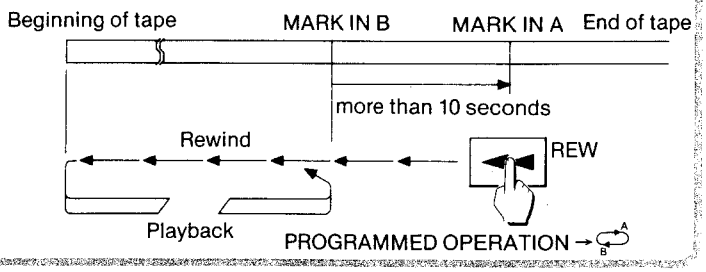
4 **Press the PLAY ► button. After playing the tape for more than 10 seconds, stop the tape momentarily.**

5 **Press the MARK IN A button*.**

6 **Press the REW ◄◄ button.**

7 **Set the PROGRAMMED OPERATION switch to A/B.**
The tape rewinds to the beginning and the unit enters the playback mode. Then, the designated portion to the point memorized on the MARK IN B button is repeatedly played back.

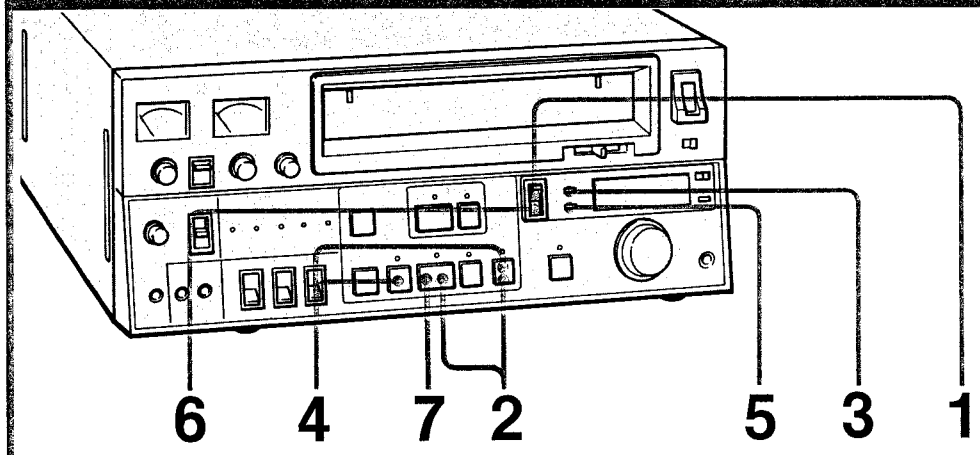
Why must the A button be pressed?
If a point before the one memorized on the MARK IN B button has been memorized on the A button, the desired portion cannot be repeatedly played back. To avoid this, a point after the desired end point must be memorized on the A button in step 5.



Memory backup function
The last memorys on the MARK IN A and B buttons and the last time counter display will be maintained due to the built-in Lithium battery even if the power is turned off. The battery provides approx. 3-year backup after the shipment. Should the memorys be lost, the battery may have been exhausted. In such a case, consult your Sony dealer.

To erase the memory
You can memorize only one point on each MARK IN A or B button. If the button is pressed several times, only the last point will be memorized.
When the RESET button is pressed with the PROGRAMMED OPERATION switch set at OFF or →A←, the memorys are erased and the "00:00" point will be memorized on both buttons.

TO REPEAT BETWEEN A PARTICULAR POINT AND THE END OF THE TAPE



1 **Set the PROGRAMMED OPERATION switch to OFF.**

2 **Search for the point from which the playback is to begin and stop the tape momentarily at that point.**

3 **Press the MARK IN A button.**

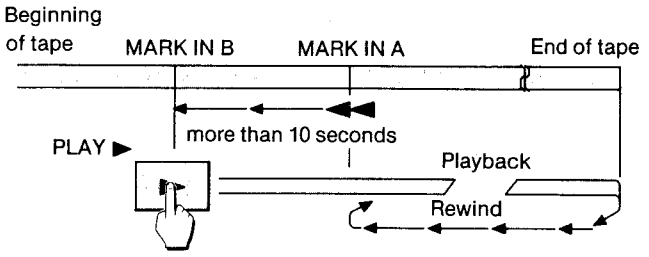
4 **Press the REW ◄◄ button to rewind the tape for more than 10 seconds then stop the tape momentarily.**

5 **Press the MARK IN B button.**

6 **Set the PROGRAMMED OPERATION switch to** $\overset{A}{\underset{B}{\supset}}$ **.**
The tape is played back to the end and rewinds to the point memorized on the MARK IN A button, and the playback of the portion from that point to the end of the tape is repeated.

7 **Press the PLAY ► button.**

Why must the B button be pressed?
If a point after the one memorized on MARK IN A button has been memorized on the B button, the desired portion cannot be repeatedly played back. To avoid this, a point before the desired point must be memorized on the B button in step 5.
The first playback begin at the point memorized on the MARK IN B button.



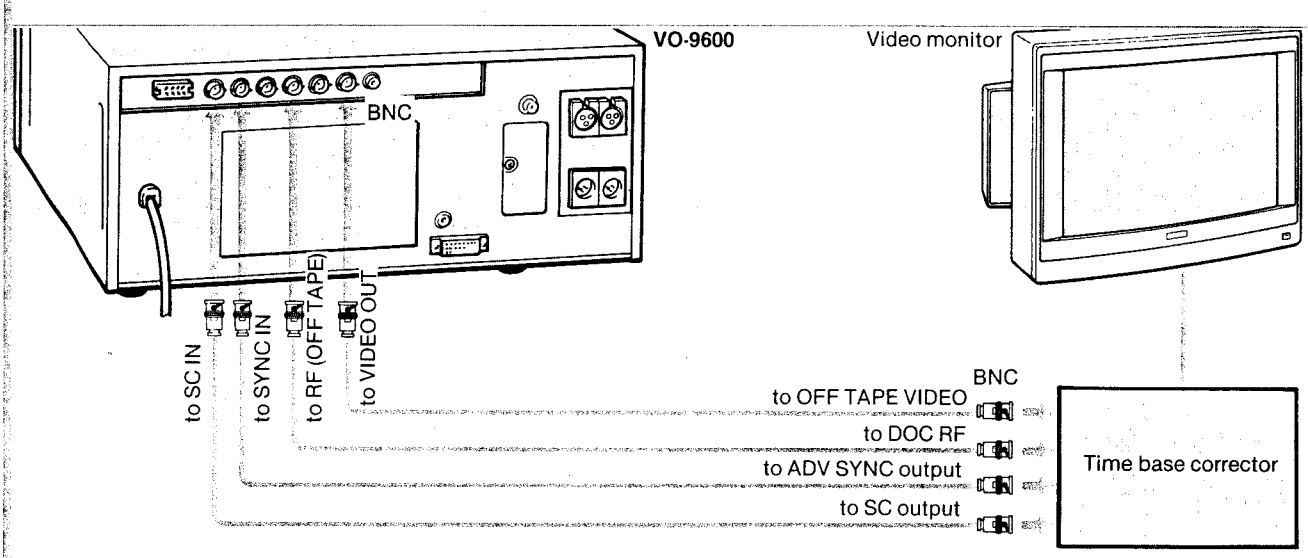
PROGRAMMED OPERATION USING FRAME CODES

When the following three conditions are fulfilled, programmed operations are possible using frame codes.
- A BKU-701 is attached to the recorder.
- A tape on which frame codes have been recorded is used.
- The FRAME CODE/CTL switch is set at FRAME CODE.

Using frame codes, another desired point can be memorized on the MARK IN A and B buttons in addition to the points memorized using CTL signals. Operation sequences are the same as those when CTL signals are used. Frame codes may enable more precise programmed operations.

PLAYBACK USING A TIME BASE CORRECTOR

The best possible picture can be obtained when a time base corrector is used. Connect the time base corrector as illustrated below, and set the TBC switch of the recorder to ON.

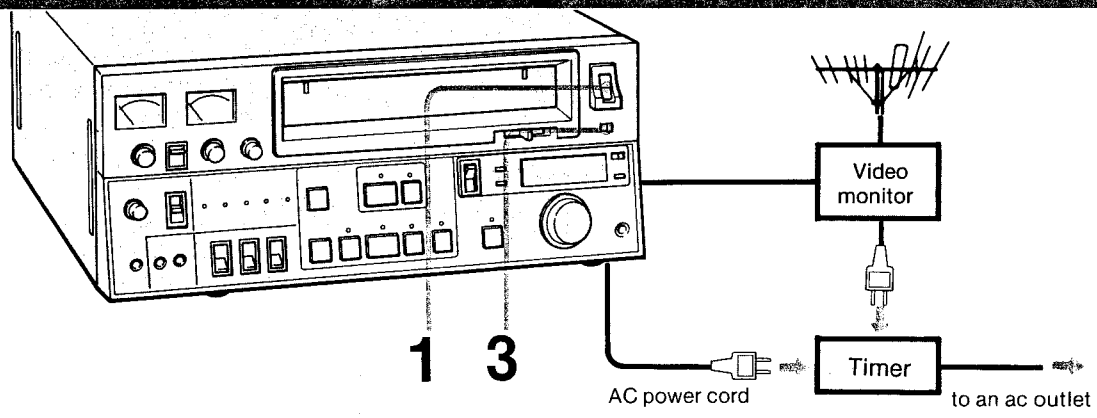


- For details on operations of the time base corrector, refer to the instruction manual furnished with it.

TIMER RECORDING/PLAYBACK

Using an optional timer, you can start and stop recording and playback while the recorder is unattended.
• For details on operations of the timer, refer to the instruction manual furnished with it.

CONNECTIONS



OPERATION

1 **Turn on the recorder and make necessory preparations for recording (see pages 19 and 24).**

2 **Set the times to start and stop recording or playback on the timer.**

3 **For recording, set the TIMER switch to REC.**
For playback, set it to PLAY.
The recorder will automatically be turned on and recording or playback will begin at the time set on the timer.

WHEN TIMER RECORDING IS FINISHED

Be sure to return the TIMER switch to OFF. If the POWER switch is set to ON with the TIMER switch remained at REC, the unit immediately enters record mode and the recorded material will be erased.

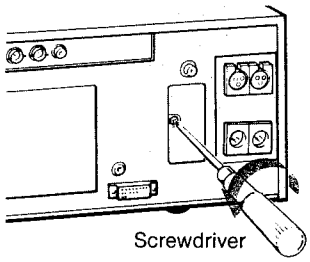
• When the TIMER switch is set at REC, function buttons other than the STOP ■ button are not operative. While the tape is being threaded just after the power is turned on, the STOP ■ button is not operative, neither.

TO VIEW A PICTURE ON A TV RECEIVER

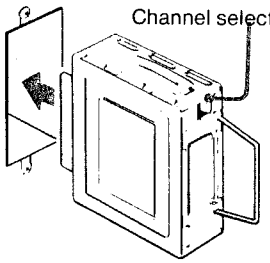
A playback picture can be viewed on a conventional TV receiver when an RF modulator of the optional RFK-634 RF kit is installed in the recorder. It is, of course, possible to see a TV program as usual.

INSTALLATION OF THE RF MODULATOR

1 **Remove the lid of the RF modulator compartment.**

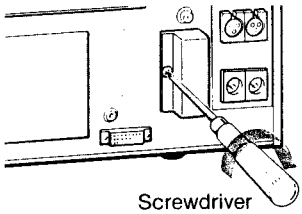


2 **Set the channel select switch on the modulator to the channel inactive in your area (channel 3 or 4).**



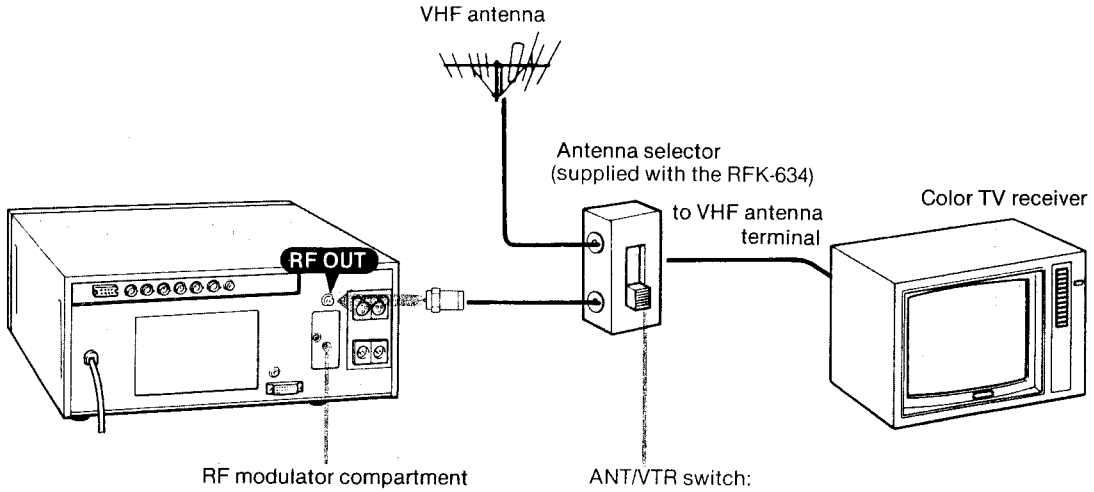
3 **Install the modulator into the compartment aligning the direction properly.**

4 **Attach the supplied compartment cover with the original screws.**



• For details, refer to the instructions furnished with the RFK-634 RF kit.

CONNECTIONS



VTR	for a playback picture
ANT	for a TV program

OPERATION

1 **Set the ANT/VTR switch on the antenna selector to VTR.**

2 **Turn on the TV receiver , and select the channel for VTR (the same channel with the output channel of the RF modulator; channel 3 or 4).**

3 **Turn on the recorder.**

4 **Insert a recorded cassette.**

5 **Select the desired audio channel with the AUDIO MONITOR switch (see page 21).**

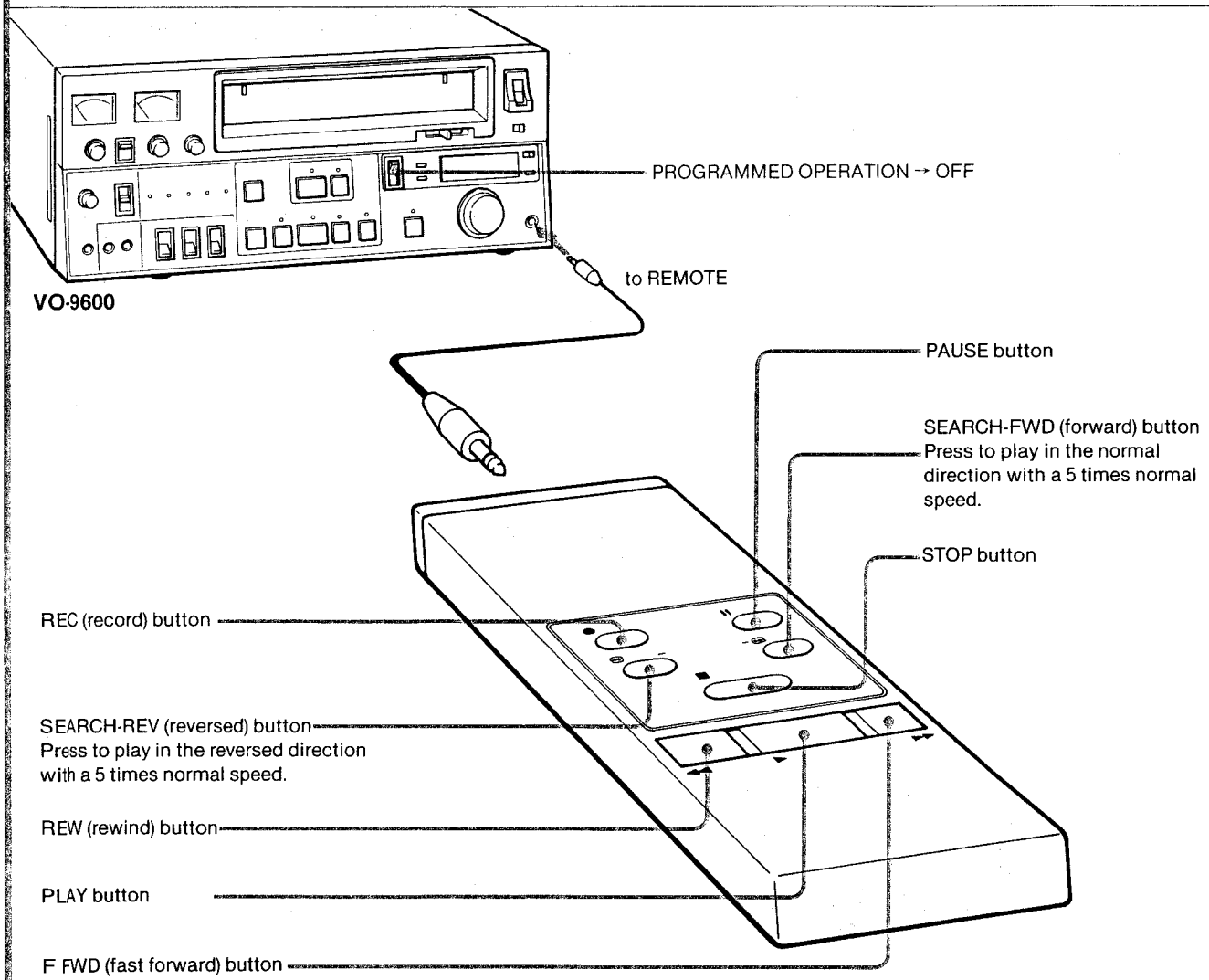
6 **Press the PLAY ► button.** You can see a playback picture on a TV screen.

REMOTE CONTROL OPERATION

USING A REMOTE CONTROL UNIT

The VO-9600 can be remotely controlled from an optional RM-690 remote control unit. The function buttons on the RM-690 correspond to those on the recorder.

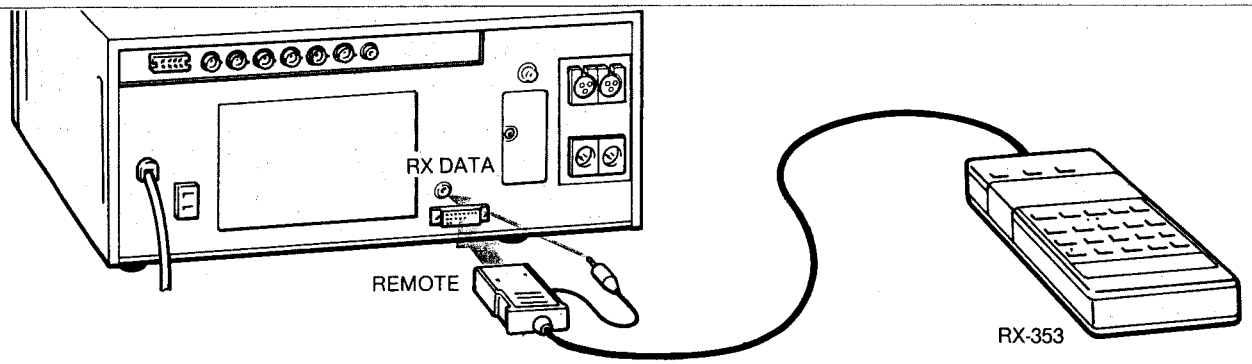
• When the RM-690 is used, set the PROGRAMMED OPERATION switch to OFF.


PROGRAMMED OPERATION → OFF
to REMOTE
VO-9600
PAUSE button
SEARCH-FWD (forward) button
Press to play in the normal direction with a 5 times normal speed.
STOP button
REC (record) button
SEARCH-REV (reversed) button
Press to play in the reversed direction with a 5 times normal speed.
REW (rewind) button
PLAY button
F FWD (fast forward) button

USING AN RX-353 OR RX-303 AUTO SEARCH CONTROL UNIT

Any desired point can be automatically located and played back using the optional RX-353 or RX-303 auto search control unit. The RX-353 and RX-303 search for a point on a tape by using CTL signals recorded on the tape.

- Be sure to turn off the recorder when connecting and disconnecting the RX-353 or RX-303.
- Set the PROGRAMMED OPERATION switch to OFF when the RX-353 or RX-303 is used.
- For details on functions and operation of the RX-353 and RX-303, refer to the instruction manuals furnished with them.



ADDRESS SEARCH

Designate the desired point in minutes and seconds. The tape will run to that point, and then playback will begin from that point.

SEGMENT SEARCH

Divide recorded materials into parts each having its own number. We call those parts "segments". Any desired segment can be played back by designating it with its number. Up to 8 segments can be automatically played back in any desired order.

- This segment search is possible only when an RX-353 is used.

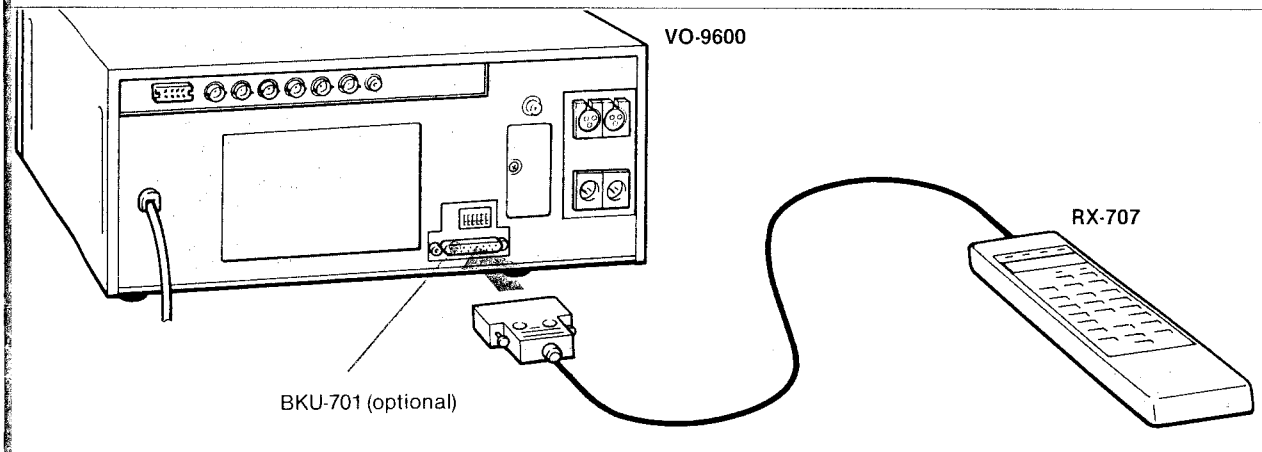
Notes

- Operations on the recorder have priority over those on the RX-353 and RX-303.
- Do not run the tape with the function buttons or search dial on the recorder when the RX-353 or RX-303 is used. This is because the tape position indication on the RX-353 or RX-303 and the actual tape position may not correspond correctly if the tape transport is controlled on the recorder.

USING AN RX-707 AUTO SEARCH CONTROL UNIT (operation using frame codes)

The optional RX-707 auto search control unit can precisely locate a desired point on a tape on which frame codes have been recorded.
To read out the frame code, an optional BKU-701 computer interface board is required. The BKU-701 is installed in place of the REMOTE connector by removing the connector from the rear panel. This means that any other device (as RX-353 and RX-303) normally connected to the 33-pin REMOTE connector cannot be used simultaneously.

- For the BKU-701, consult your Sony dealer.
- Be sure to turn off the recorder when connecting or disconnecting the RX-707.
- Set the PROGRAMMED OPERATION switch on the recorder to OFF when the RX-707 is used.
- For details on functions and operations of the RX-707, refer to the instruction manual furnished with it.



SIMPLE SEARCH

Designate the desired picture with the frame code.

PROGRAMMED SEARCH

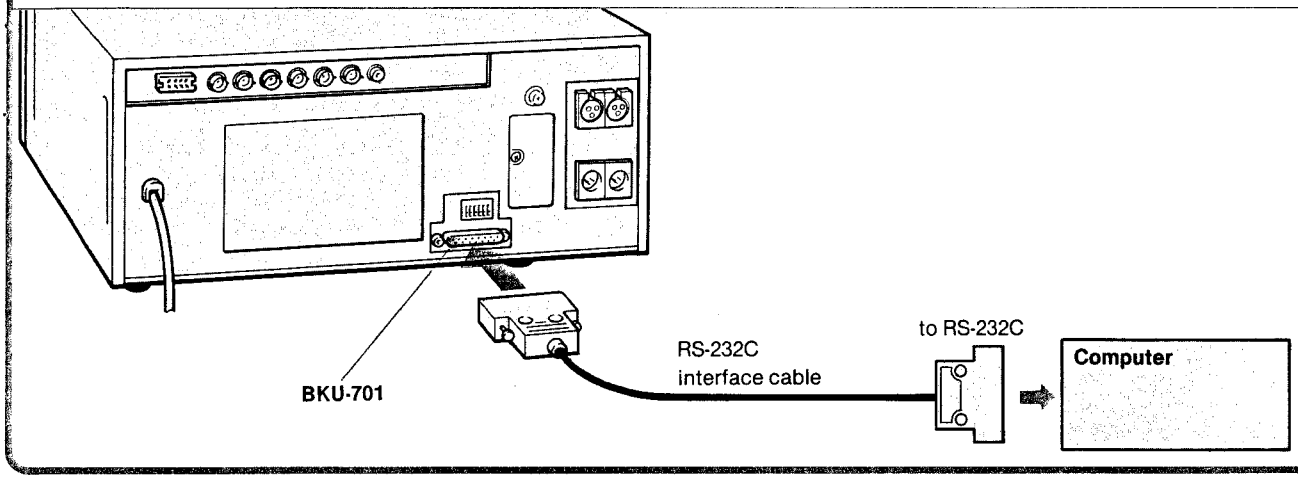
Designate the beginning and end of a desired portion with the frame codes, and set the number of times to repeat the playback of that portion. We call this "programming" and give each program its own number. Thus, a desired portion can be automatically played back as much times as desired just by designating the program number.

SEQUENTIAL SEARCH

Up to 15 programs can be automatically played back in any desired order.

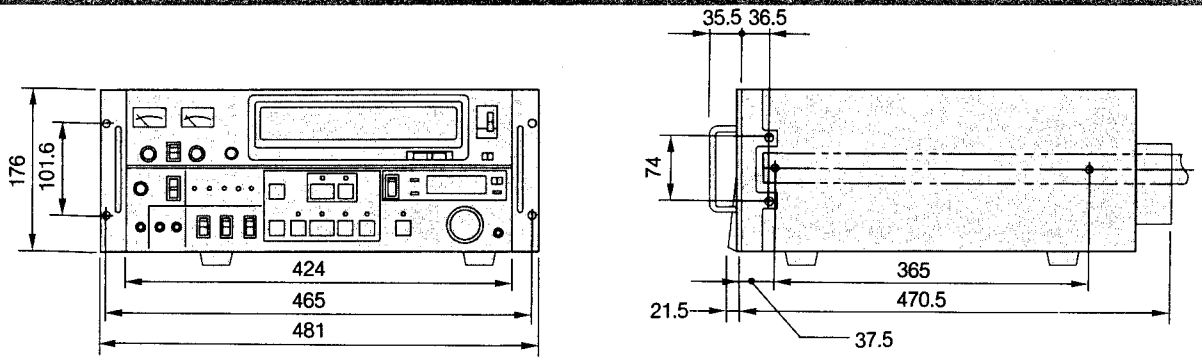
CONNECTION OF A COMPUTER

Installing a BKU-701 permits not only an RX-707 but a commercially available computer equipped with an RS-232C interface to be connected to control the VO-9600.



RACK MOUNTING

The VO-9600 can be mounted into a standard 19-inch rack. When your unit is to be mounted in a rack, consult your Sony dealer.



Unit:mm

SPECIFICATIONS

System

Recording system Rotary 2-head helical scan
Luminance: fm recording
Color signal: converted subcarrier direct recording
Video signal system
EIA standards, NTSC color

Video

Inputs
VIDEO IN (BNC type) ×1
1.0 Vp-p ±0.3 Vp-p, 75 ohms, unbalanced sync negative
TV (8-pin) ×1
Outputs
VIDEO OUT 1, 2 (BNC type) ×1 each
1.0 Vp-p ±0.2 Vp-p, 75 ohms, unbalanced sync negative
TV (8-pin) ×1
Horizontal resolution
SP mode recording: 330 lines (both B/W and color)
Conventional recording: 250 lines (both B/W and color)
S/N
SP mode
Color: more than 46 dB
Luminance (Y): more than 48 dB
Conventional format
Color: more than 46 dB (color)
B/W: more than 48 dB
Subcarrier input
SC IN (BNC type) ×1
1 Vp-p (0.5 to 3 Vp-p), 75 ohms, unbalanced
Sync signal input
SYNC IN (BNC type) ×1
2.5 Vp-p (1 to 5 Vp-p), 75 ohms, unbalanced
RF OUT (OFF TAPE) ×1
0.5 (0.3 to 1.0 Vp-p), 75 ohms, unbalanced
Recording level control
Automatic

Audio

Inputs
AUDIO LINE IN CH-1/L, CH-2/R (XLR 3-pin female) ×1 each
+4 dB, 10 k ohms, balanced
MICROPHONE CH-1/L, CH-2/R (phone jack) ×1 each
−60 dB, 3 k ohms, unbalanced
TV (8-pin) ×1
Outputs
AUDIO LINE OUT CH-1/L, CH-2/R (XLR 3-pin male) ×1 each
+4 dB (at 600 ohm load), balanced
AUDIO MONITOR (phono jack) ×1
−5 dB (at 47 k ohm load)
TV (8 pin) ×1
HEADPHONES (stereo phone jack)
For 8-ohm headphones
Level adjustable (from −26 to −46 dB)
S/N
With Dolby NR off
52 dB (KSP, KSP-S tapes)
50 dB (KCA, KCS tapes)
(both channel 1 and 2 at 3% distortion)
Frequency response 50 to 15,000Hz ± 3 dB (both audio channel 1 and 2 with Dolby NR off)
Recording level control
Manual or limiter selectable

Other functions

Memory backup of programmed operation
3 years from shipment
Pause
A still picture is obtained with long pause function
Search
Still, 1/30 to 5 times normal speed in both forward and reverse directions
With RM-580 and RM-500: picture serach with 8 times normal speed (both KSP and KSP-S tapes)
Tracking control
Possible
Skew control
Possible
Sync system
Automatic switching between internal and external
Dropout compensator
Built-in

Tape transport

Tape speed
95.3 mm/sec.
Recording and playback time
Approx. 60 minutes (with KSP-60)
Fast forward and rewind time
Within 4 minutes (with KSP-60)
Wow and flutter
Less then 0.18% RMS
Tape compatibility
U-matic video cassette tapes
Usable tapes
KSP, KSP-S, KCA, KCS type

General

Power requirements
100 - 120 V AC, ±10%, 50/60Hz ±10%
Power consumption
75 W (with the RM-580 and RFK-634)
Operating position Horizontal
Storage temperature
−20°C to +60°C
Operating temperature
5°C to 40°C
Dimensions
424 × 192 × 492 mM (w/h/d)
(16 3/4 × 7 5/8 × 19 3/8 inches)
including projecting parts and controls
Weight
Approx. 18 kg (39 lb 11 oz)
Supplied accessories
Operating instructions (1)
RF modulator compartment cover (1)

Design and specifications are subject to change without notice.

Optional accessories

BKU-701 computer interface board
FCG-700 frame code generator
RX-707 auto search control unit (for RS-232C interface)
RX-353, RX-303 auto search control unit (for 33-pin interface)
RM-690 remote control unit (for REMOTE connector)
RM-580, RM-500 remote control unit (for 33-pin interface)
RFK-634 RF kit
RMM-507 rack mount kit
RM-555 multi remote control unit

TROUBLESHOOTING

Should you have a problem on you recorder, first check the three items in Check 1 and then the appropriate item in Check 2 or Check 3.

CHECK 1

1 **Check that the AC power cord is firmly connected.**
2 **Check that the POWER switch is set to ON.**
3 **Check the connections. (See pages 14 to 17.)**

CHECK 2

Symptoms	Possible causes and corrective actions
AUTO OFF lamp lights and function buttons do not function.	Moisture has condensed inside the unit. keep the power on and wait until the lamp goes off indicating that the moisture has evaporated (see page 42).
The tape suddenly stops and function buttons do not function.	Eject the cassette and take up the leader tape manually. Reinsert the cassette and press function buttons again. If the recorder does not function, turn off the recorder and contact your nearest Sony service facility.
The STANDBY lamp remains lit and the recorder does not operate even though the lamp of the function button pressed is lit.	
The cassette cannot be ejected.	Turn off the recorder and contact your nearest Sony service facility.

CHECK 3

Symptoms	Corrective actions
A cassette cannot be inserted.	• Insert the cassette with the label side up. • Check whether another cassette has already been inserted. • Check whether the AUTO OFF lamp is lit.
The tape doesn't run when any of the function buttons is pressed.	• Check that the TIMER switch is **not** set at REC. • Check whether the STANDBY lamp is lit. When so, once turn off the power.
Recording cannot be done.	• Check that the REC lamp is lit. • Check that the red button on the bottom of the cassette is in place. • Check the INPUT SELECT switch setting. • Adjust the audio recording level. • Prepare the program to be recorded. • Check that the PROGRAMMED OPERATION switch is set at OFF.
Recording or playback immediately begins when the recorder is turned on.	• Check that the TIMER switch is **not** set at REC or PLAY.
Snow or streaks appear on the playback picture.	• Adjust the TRACKING control. • Clean the video head. • Check that the TBC switch is **not** set at ON when no time base corrector is used.
Hooking distortion appears at the upper part of the playback picture.	• Adjust the SKEW lever.
Sound is not heard.	• Check the AUDIO MONITOR switch setting.

When the unit is moved directly from a cold place to a warm place, or when the unit is operated in a place with high humidity, moisture may condense inside the unit. If the tape runs in this condition, it may adhere to the head drum or the tape guide and be damaged. To prevent this possibility, the unit is equipped with a moisture detector. The AUTO OFF lamp lights to indicate that moisture has been detected inside the unit. When this lamp is lit, the cassette is automatically ejected, if it is inserted, and the unit does not function, even if any of the function buttons is pressed.

- When the unit is first moved to place in which it is subjected to condensation, we recommend you to wait for about ten minutes and to turn the power so on that the moisture detector will operate.

If the picture temporarily disappears or if snow or noise show up in the picture, the video head is contaminated and should be cleaned. Use the optional KC-1C cleaning cassette and perform cleaning as follows.

1 **Insert the cleaning cassette.**

2 **Press the RESET button to set the tape counter to "00:00".**

3 **Press the PLAY ► button.**

4 **Let the cleaning cassette run for about 30 seconds and then press the STOP ■ button.**

5 **Press the EJECT ⏏ button to remove the cleaning cassette.**

- Do not run a cleaning cassette for more than 30 seconds at a time, nor use it unless the picture symptoms clearly indicate the need for head cleaning. Excessive use of the cleaning cassette will shorten the life of the heads.
- Do not rewind the cleaning cassette every time it is used.
  Run the tape to its end, then rewind it.
- You can run through a cleaning cassette several times, although it does gradually become less effective.

If picture quality is still deficient after cleaning, the video heads may need to be replaced. The life of the heads is approximately 500 – 1000 hours of use. With this unit, the accumulated operation time of the heads can be checked as follows.

1 Set the PROGRAMMED OPERATION switch to $\overset{A}{\underset{B}{\circlearrowleft}}$.

2 Keep the RESET button depressed for about 2 seconds.

The total accumulated operation time of the head drum is now shown on the counter in 50-hour increments.

Regarding head replacement, please consult your Sony service facility.